TECHNOLOGY DEPT

- 1957-58 production and consumption trends
- Functional coating of paper
- New developments in cold soda pulping
- American Forest Products mill in operation

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

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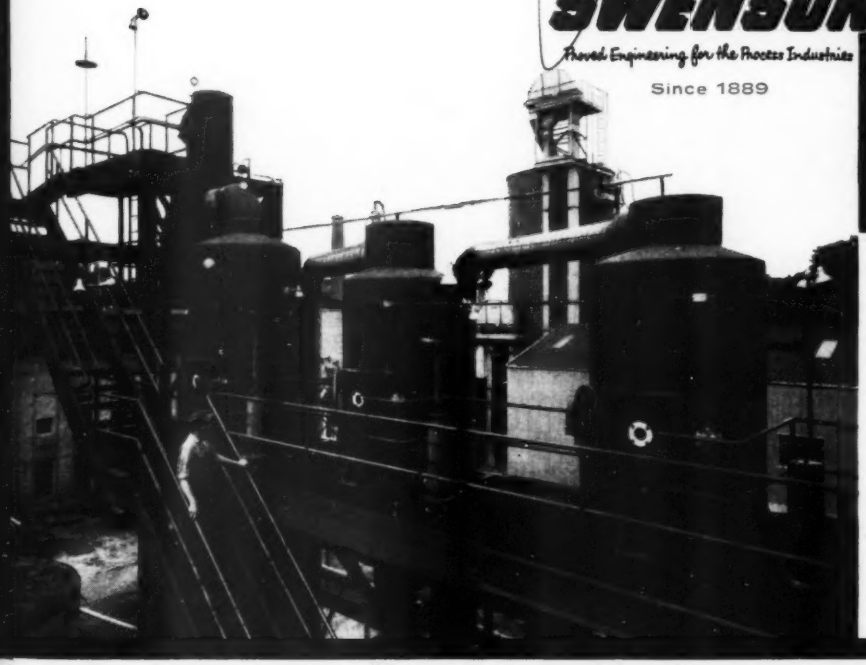

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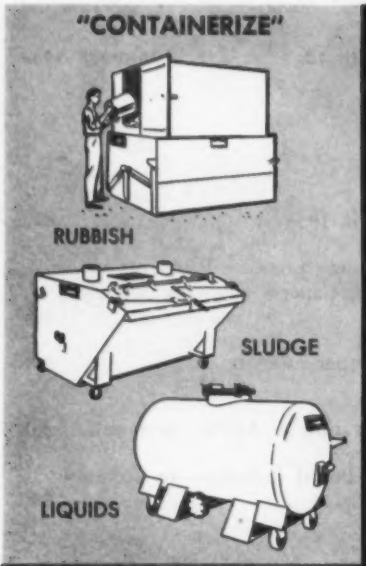

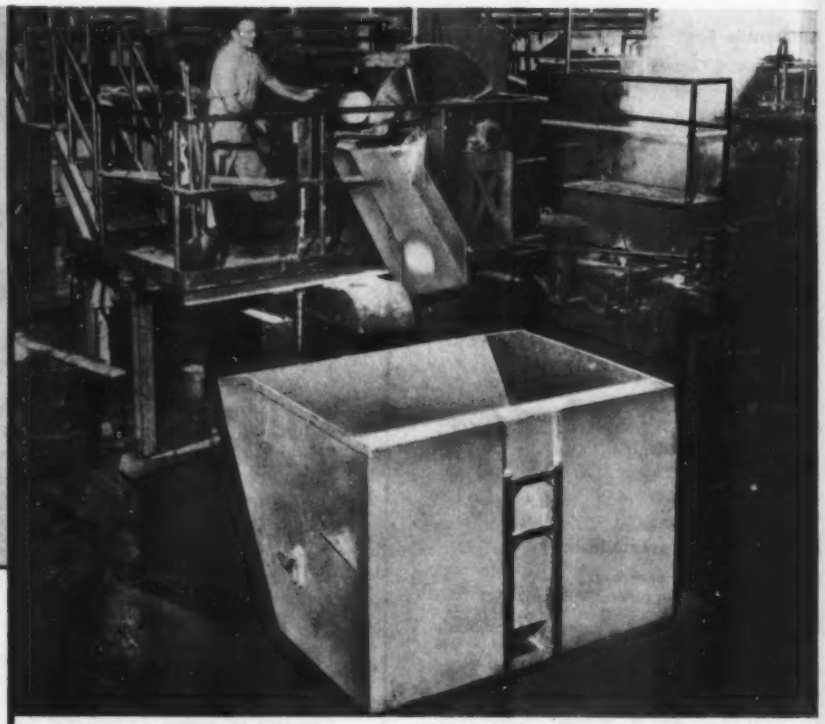

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From our point of view . .

Where do we stand in 1958?

Will the year 1958 permeate our nation with renewed vigor or will it continue with a relatively mild but nevertheless disturbing recession for the greater part of the year?

When we have nothing more to contend with than something as inconstant as the national mood to set the pace of this country's 1958 business activity, the year 1958 — at its advent — seems a completely unknown quantity. The national mood in recent months seemed to be imbued with a nostalgic preoccupation for a business recession — which apparently neither the press nor a large segment of business are capable of viewing without experiencing symptoms of a mild paralysis.

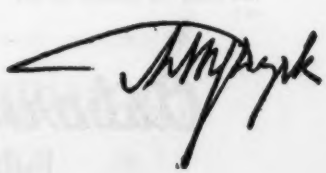
To us this mood appears so unrealistic that the implementation of any strong constructive measures to bolster and give direction to the national economy could quickly swing the public attitude away from its feeling of caution, indecision, and uncertainty.

The challenge flung at us by the launching of the sputniks cannot entitle this nation to the "luxury" of a business recession. Indeed, if we were to predict from past experiences the vigor of public reaction to a national challenge, the first paralyzing fears brought about by unfriendly satellites orbiting in space over our territory must soon and inevitably be replaced by a dogged determination not to give way to panic, but to proceed more vigorously with constructive measures.

Moreover, the role that history seemingly has chosen to assign to this country is in complete opposition to a mood that would tolerate a weakening of our national economy — a mood that has its origin largely in defeatism or in a refusal to think realistically and in terms of this country's tremendous assets — both active and potential — of material resources, scientific know-how, and compassion for its fellow men.

Our problems cannot be solved if we allow ourselves the luxury of standing still. We must acquire the habit of anticipating problems and solving them before they mature or before they are forced upon us.

Let us think and act realistically. Let us think imaginatively and boldly without being ostentatious — as we should and as we can well afford.



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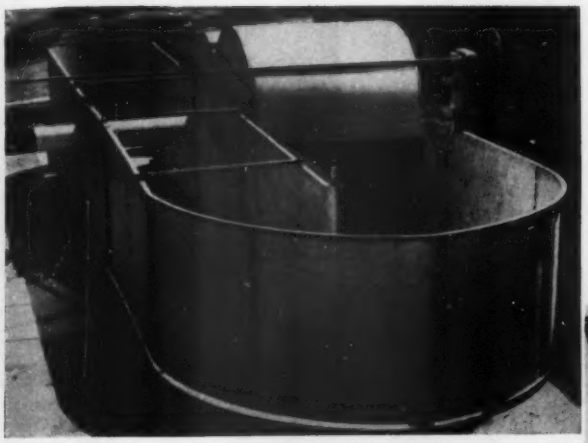

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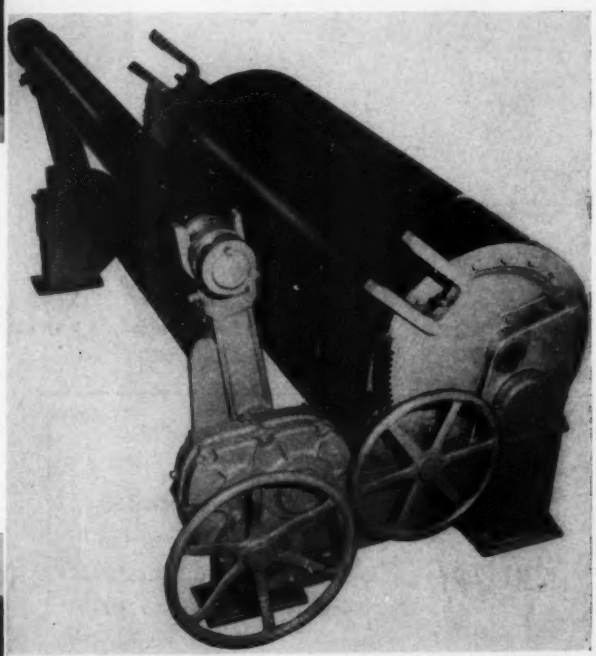

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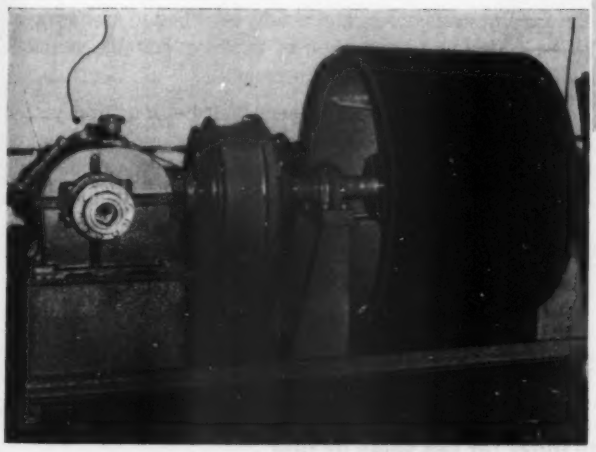

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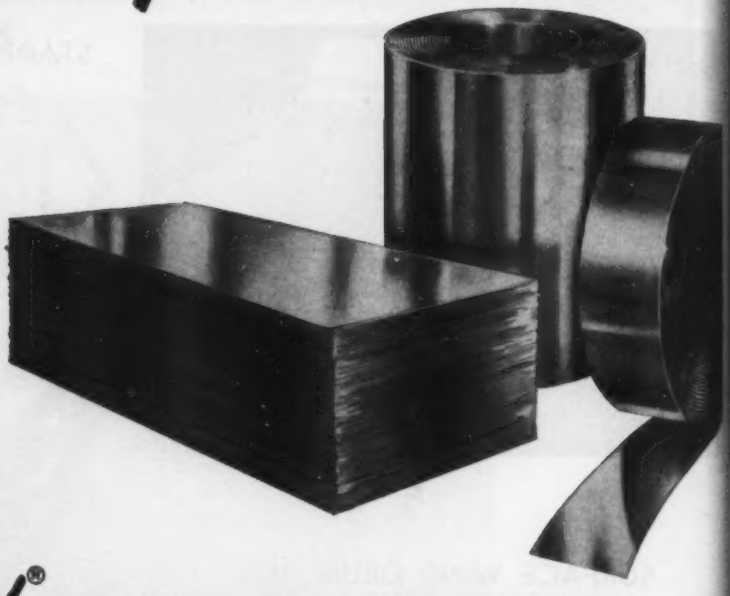

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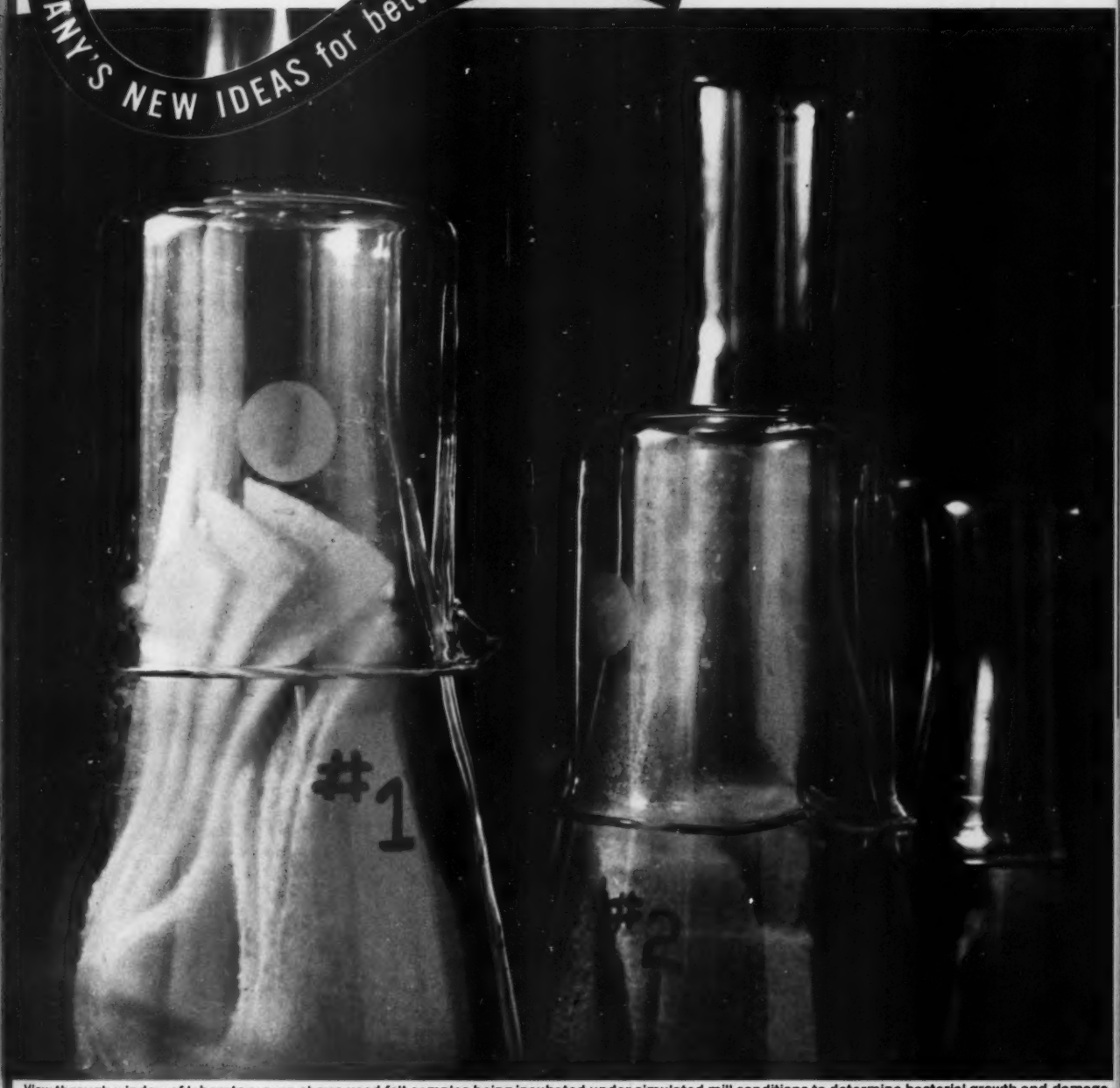

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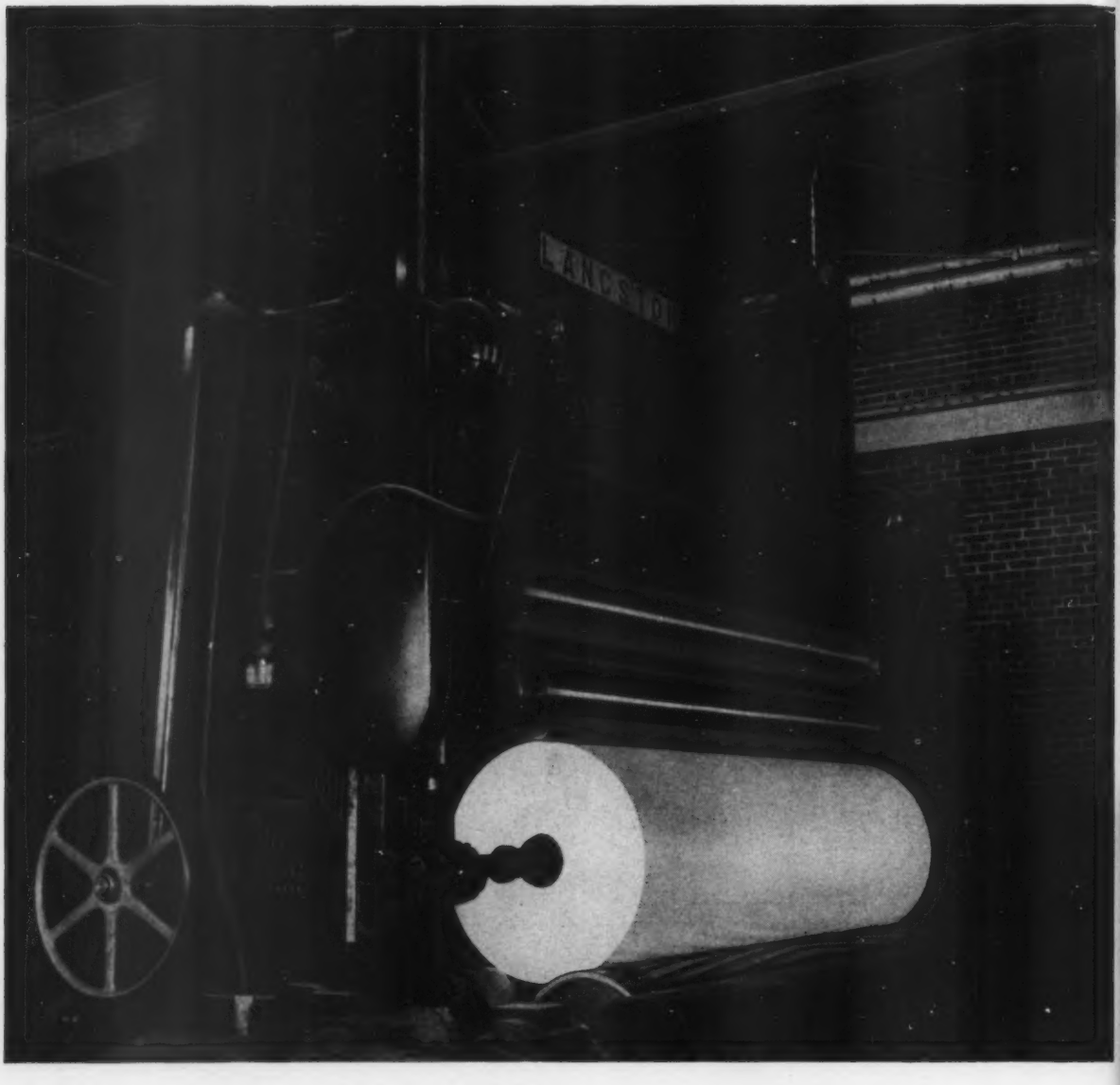

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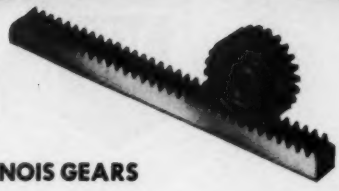

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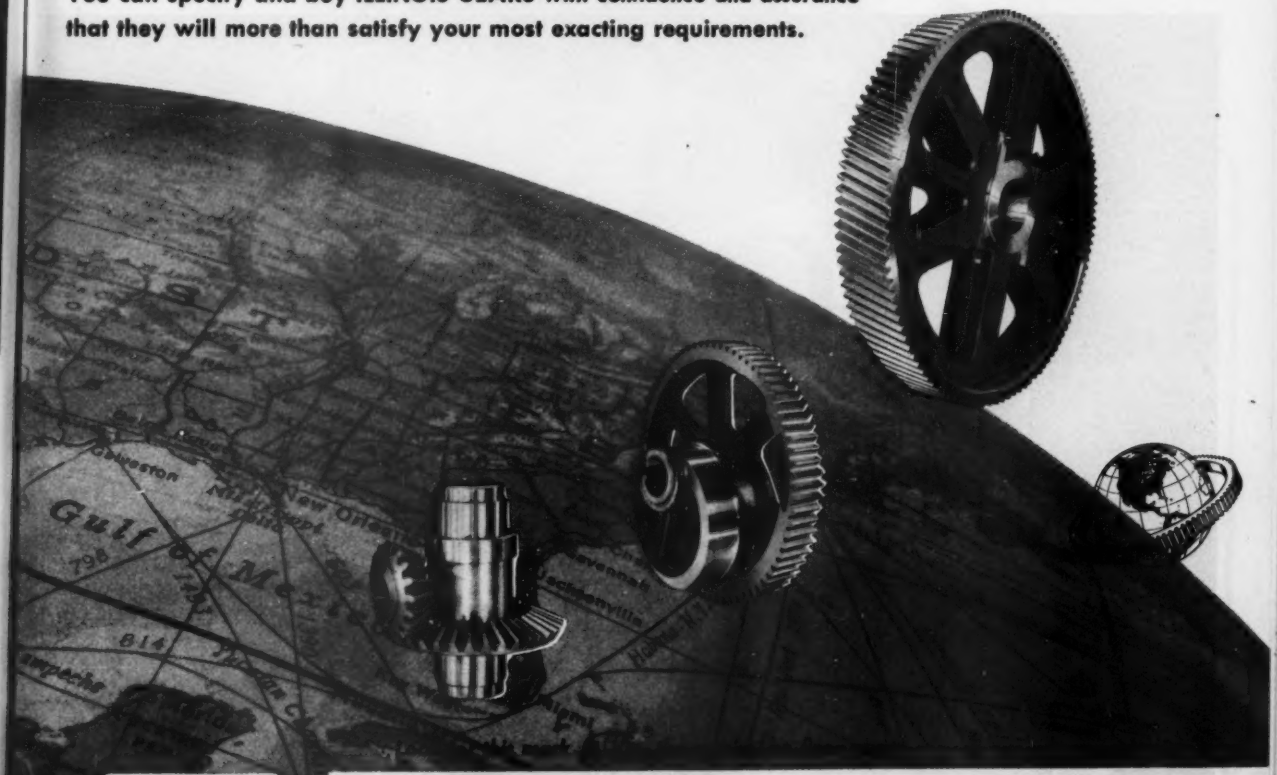

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1. The contest is open to all employees of pulp and paper mills in North America.
2. Your paper should be confined to 1500 words, typed with double spacing on one side only of plain sheets, 8½" x 11".
3. Place your name, the name and address of your mill, your position or duties and your home address on the cover sheet only. This information must not appear in the manuscript.
4. Mail your entry before midnight March 31, 1958 to: The Secretary and Treasurer, The American Pulp and Paper Mill Superintendents Association, 327 So. LaSalle Street, Chicago 4, Illinois.

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Feature articles

The 1957-1958 position of the paper industry

JOHN H. VOGEL
Economist, American Paper & Pulp Association

With an output of 30.7 million tons, 1957 has been the second best year in the history of the paper industry.

THE PAPER INDUSTRY — in common with other industries — experienced an easing of demand for its products during 1957. As a result, production, which had advanced to a new high in each of the preceding four years, decreased to 30.7 million tons. Although this was approximately 2 per cent less than in 1956, it nevertheless represented the second best year in the history of the industry.

The warning flags, indicating that 1957 might prove to be somewhat less satisfactory than its immediate predecessor in terms of production, sales and profits, were raised in the latter part of 1956. At that time mill order backlogs began to diminish, as inventories in the hands of customers rose to the point where purchases were cut-back to bring inventories into balance with their sale and use requirements — a situation that was compounded by evidence that increases in production capacity by the industry were of such a magnitude as to assure an adequate supply in the immediate future.

When this development first became apparent, it was believed prospects were good, and that a general revival of the economy in the latter part of 1957 would sufficiently stimulate demand to require a production of paper and board approximating that of 1956. As the year progressed, however, and industrial and commercial activity continued in its prolonged sideward movement, it became clear that demand for the products of a number of basic industries — including steel and automobiles — was lacking in strength and that the economy was losing momentum.

The subsequent adjustment of inventories was completed by September for the manufacturers of containers, and mills producing paperboard were again operating at a high rate in the autumn of 1957. Manufacturers of paper did not experience a similar increase in demand, but it is generally believed that customer inventories are no longer of excessive proportion, and that any increase in over-all demand would be transmitted to producers without much delay. It should be pointed out, however, that currently such a revival of demand is not anticipated until the latter part of 1958. On balance it appears reasonable to assume that if the expected improvement occurs in the last half of 1958, the total output of paper and board should approximate 31.5 million tons.

Dollar volume of sales maintained

The dollar volume of sales also was well maintained, as a result of moderate price increases, and amounted to about 10.5 billion dollars for the paper and allied products industry. This was within 1 per cent of the value of shipments for 1956.

For paper grades other than newsprint, the increases for the papers included in the index maintained by the Bureau of Labor Statistics ranged from zero for wrapping tissue to 4.2 for printing paper (A-1, machine finish, 25 × 38, 40#/500). The average increase for the group shown was 2.6 per cent. It is of interest to note that the price increases for wood pulp, paperboard and shipping sacks did not occur until October (Table I). While both production and sales were relatively well maintained, however, the combined effect of rising transportation, labor and raw material costs, and the under-utilization of the industry's increased capacity to produce, was to reduce the industry's profits by about 18 per cent at the end of the third quarter. As a result of the previously referred to resurgence in the production and sales of paperboard, however, the prospect is that the decrease in profits for the year as a whole will range between 15 and 17 per cent (Table II).

Early in the year the United States Department of Commerce issued a comprehensive study of the prospective supply and demand for pulp, paper and board through 1965. The Department projections indicated possible increases in production from the 1956 level of 15 per cent by 1960 and 39 per cent by 1965. The past year, however, represented a downward deviation from trend, which it now appears will not be recovered in the immediate future. Thus, to achieve the original projection for United States production in 1958 would require an increase in total output equal to 10 per cent. The most substantial lags appear in newsprint, special food board and building paper and board, which would require increases exceeding 20 per cent (Table III).

Pulpwood consumption almost 36 million cords

In 1957 the consumption of pulpwood was well maintained on a national basis, amounting to 29.8 million cords at the end of 10 months. This was 1 per cent less than for the same period in 1956 and, if the same relationship were maintained for the balance of the year, the total quantity of wood used would be 35.8 million cords. On a regional basis, increases of about 1 per cent in consumption in the West (including Alaska) and the South Central States offset to a large degree decreases in the Northeast and Lake Central re-

Table I
Wholesale Price Indexes for Paper and Allied Products and Selected Items, January and October 1957
(1947-49 = 100)

	Jan.	Oct.	% Change
Pulp, paper and allied products	128.6	130.9	1.8
Wood pulp	118.0	121.2	2.7
Waste paper	77.3	88.5	14.5
Paper	139.2	143.2	2.9
Paper, except newsprint	140.6	144.3	2.6
Printing paper	125.3	130.6	4.2
Wood bond paper	139.7	144.5	3.4
Writing paper	138.0	141.6	2.6
Wrapping paper	147.9	151.7	2.6
Butcher's paper	144.9	147.4	1.7
Waxing paper	136.9	137.0	0.1
Wrapping tissue	135.4	135.4	....
Newsprint	136.1	140.6	3.3
Paperboard	136.2	136.6	0.3
Container board	125.0	125.0	....
Folding boxboard	157.3	158.0	....
Set-up boxboard	132.4	133.0	0.5
Converted paper and paperboard products	125.6	126.9	1.0
Paper bags and shipping sacks	130.8	136.6	4.4
Sanitary paper and health products	122.8	123.6	0.7
Building paper and board	141.1	141.7	0.4

Source: U. S. Dept. of Labor.

Table II
Paper and Allied Products, Sales and Profits, 1947 to 1957
(in billions of dollars)

Year	Sales	Profits
1947	5.53	569.5
1948	5.85	485.5
1949	4.86	364.5
1950	6.66	559.4
1951	8.20	524.8
1952	7.65	413.1
1953	8.37	452.0
1954	8.49	475.4
1955	9.85	604.0
1956	10.69	657.0
1957 (est.)	10.56	540.0

Source: Bureau of Internal Revenue and Federal Trade Commission.

gion of 7 and 4 per cent, respectively.

Inventories of wood at the close of October were equal to slightly more than five months of consumption at the October rate in the Northeast and Lake States; three months in the West, and about 16 days in the South.

Due to changes that have been made in the composition of the geographic regions used by the Bureau of the Census in computing pulpwood data, a detailed analysis of the use of hardwood is not possible. It can be stated, however, that during the first 10 months of 1957, hardwood species have been equal to 17.7 per cent of the total quantity used. If this ratio is maintained in the last two months, 6.3 million cords of hardwoods — a record high — will have been used. Thus, while total use of wood will be down by about 1 per cent, the use of hardwoods will have risen by 4 per cent.

When one limits his observation to the fact that from 1947 to 1957 the use of hardwoods has increased from 13.6 to 17.7 per cent of the total quantity of pulpwood used,

(Continued on page 843)

Table III
United States Production of Paper and Board 1956 and 1957 and Department of Commerce Projections for 1958 and 1960

	1956	1957 (est.)	Per Cent Change 1956/1957	U. S. Dept. of Commerce Projections 1958	1960	Ratio of 1958 and 1960 Projections to est. 1957 1958	1960
Total Paper and Board	31,428	30,720	−2.3	33,997	36,514	110.7	118.9
Total Paper	13,976	13,575	−2.9	14,822	15,874	109.2	116.9
Newsprint	1,620	1,780	+1.0	2,145	2,475	120.5	139.0
Printing Paper	4,304	4,035	−6.2	4,255	4,470	105.5	110.8
Fine Paper	1,570	1,530	−2.5	1,643	1,733	107.4	113.3
Coarse and Spec. Ind.	4,630	4,300	−7.1	4,810	5,085	111.9	118.3
Sanitary and Tissue	1,854	1,950	+5.2	1,969	2,111	101.0	108.3
Total Paperboard	14,381	14,270	−0.8	15,690	16,930	110.0	118.6
Container Board	7,763	7,685	−1.0	8,265	8,810	107.5	114.6
Bending Board (ex. food board)	2,816	2,870	+1.9	3,090	3,255	107.7	113.4
Special Food Board	1,292	1,290	−0.2	1,560	1,900	120.9	147.3
Nonbending and Other Board[1]	2,510	2,425	−3.4	2,775	2,965	114.4	122.3
Total Building Paper and Board	3,071	2,855	−7.0	3,485	3,710	122.1	129.9
Building Paper	1,429	1,325	−7.3	1,707	1,815	128.8	137.0
Building Board	1,642	1,530	−6.8	1,778	1,895	116.2	123.5

(1) Includes wet machine Board

Table IV
Wood Pulp: Production, Imports, Exports and New Supply, January-October 1956 and 1957

Thousands of Tons

	1956 Prod.	1956 Imp.	1956 Exp.	1956 New Supply	1957 Prod.	1957 Imp.	1957 Exp.	1957 New Supply	% Change 1956 to 1957 Prod.	Imp.	Exp.	New Supply
Total	16,656	1,754	401	18,009	16,254	1,579	486	17,347	− 2.4	−10.0	+21.1	− 3.7
Dissolving and special alpha	711	152	159	704	762	106	191	677	+ 7.2	−30.3	+20.1	− 3.8
Bl. sulfite, paper grades	1,508	304	32	1,780	1,401	291	54	1,638	− 7.1	− 4.3	+68.8	− 8.0
Unbl. sulfite	515	294	30	779	477	216	36	657	− 7.4	−26.5	+20.0	−15.7
Fully bl. sulfate	2,725	481	82	3,124	2,808	479	109	3,178	+ 3.0	− 0.4	+34.0	+ 1.7
Semi-bl. sulfate	362	48	58	352	415	55	47	423	+14.6	+14.6	−19.0	+20.1
Unbl. sulfate	6,023	222	33	6,212	5,709	219	48	5,880	− 5.2	− 1.4	+45.5	− 5.3
Soda	361	32	1	392	324	28	1	351	−10.2	−12.5	—	−10.5
Groundwood	2,271	210	0	2,481	2,261	172	0	2,433	− 0.4	−18.1	—	− 1.4
Defibrated and exploded	919	0	0	919	851	0	0	851	− 7.4	—	—	− 7.4
Semichemical & other	1,159	0	0	1,159	1,161	0	0	1,159	—	—	—	—
Screenings & off-quality	102	11	5	108	90	12	2	100	−11.8	+ 9.1	−60.0	− 7.4

Source: U.S. Pulp Producers Association.

Osborne's paper machine in operation at AFPC'S new mill

American Forest Products' new mill at Newark, Cal., has a daily output capacity of 50 tons of corrugating medium.

IN ITS DRIVE toward a completely integrated wood product and corrugated container manufacturing operation, American Forest Products Corp. has added a new mill to its industrial facilities at Newark, Cal. The new mill has a daily output capacity of 50 tons of .009-.016 pt. corrugating medium for use in the corporation's adjacent corrugated container plant. Waste paper as well as wood waste from the company's logging and box plant operations will be used as raw material.

The mill, 300 ft. long and 50 ft. wide, is constructed of reinforced concrete, with precast concrete columns and trusses. The 140- by 50-ft. basement houses the pulper, water chests, pumps and agitators. The equipment on the ground floor includes the paper machine, jordans, centrifugal cleaners and screens.

Louis Meunier, who also contributed largely in the design and planning of the new mill, is general manager, while Clarence Whittier is mill superintendent.

The paper machine

The 104-in. fourdrinier features a 90-in. by 100-ft. wire and a stainless steel open headbox equipped with adjustable inlet and slice. The wire, supported on 53 table rolls, can be oscillated by a two-way shaking mechanism adjustable for length and frequency.

The fourdrinier also has eight suction boxes, a 30-in. diameter couch roll, a 12-in. diameter rubber-covered lump breaker roll (which is pneumatically loaded) and two wire return rolls—one with automatic take-up and the other with hand stretch. Four vacuum pumps provide the vacuum for the suction boxes, the couch roll and the suction presses.

L. J. Meunier
Gen. Manager

C. Whittier
Mill Superintendent

The press section consists of two suction presses equipped with brass bottom rolls and rubber-covered top rolls.

All bearings on the wire rolls and the felt rolls are of the self-aligning, anti-friction type and are equipped with swing cap style housings.

Following the press section there are thirty 48-in. diameter drying cylinders. These cylinders are arranged in two sections separated by an 18-in. pneumatically-loaded smoothing press. The cylinders are operated under a pressure of 30-150 psi, depending on the grade of paper being manufactured. All dryer section bearings are enclosed and automatically lubricated.

At the end of the second dryer section there is a five-roll breaker stack followed by two 36-in. diameter after-dryers and a five-roll finishing calender stack.

A surface-type wind reel is designed to make 60-in. diameter paper rolls. The latter are moved by an overhead crane to a rewinder equipped with circular knives for trimming. A trim blower conveys the trim back into the stock preparation system.

Paper machine drive

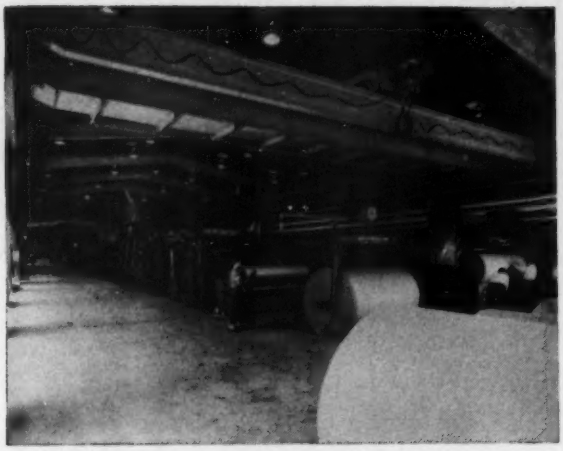
The paper machine is driven by a 200-hp electric motor through a dynomatic clutch connected to a constant-speed lineshaft, which in turn is connected to the machine through a system of belts and cone pulleys, air clutches and speed reducers. The drive system features anti-friction bearings throughout.

Advantage is taken of the heat generated in the dynomatic clutch as a result of running the machine at a lower speed than that of the drive motor. Water is circulated through the clutch, and the hot water leaving the clutch is pumped to the pulper and hot water storage.

The air-operated clutches linking the lineshaft to the machine are controlled from a single control panel located opposite the press section.

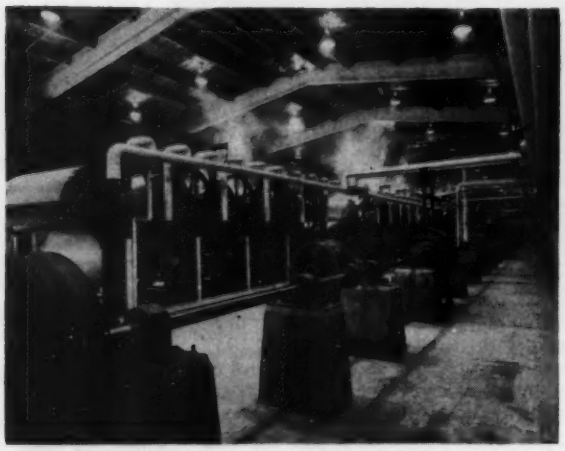
All belts used in the drive system are Extremultus belts—a German product showing exceptional strength, elasticity and flexibility—and credited with a high efficiency and economy of operation.

Osborne-made paper machine seen from wet end.



Osborne-made paper machine seen from dry end.

The paper machine drive and press section.



The paper machine drive and the dryer section.

Principal Equipment Installed at AFPC mill

Calender stacks (2), 5-roll, one breaker and one calender ..... Osborne Paper Mill Equipment Corp.

Centrifler (1) ..... Bird Machine Co.

Dirtecs ..... Bird Machine Co.

Dryer section, 30 cylinders of 48-in. diameter ..... Osborne Paper Mill Equipment Corp.

Fourdrinier, 104-in. wide with stainless steel headbox ..... Osborne Paper Mill Equipment Corp.

Jordans (2), Miami No. 6, each driven by 400-hp synchronous motor ..... Black-Clawson Co.

Motors, electric ..... General Electric Co.

Press section, two suction presses ..... Osborne Paper Mill Equipment Corp.

Paper machine drive with lineshaft, belts and cone pulleys, driven by 200-hp General Electric motor ..... Osborne Paper Mill Equipment Corp.

Reel, Pope surface type ..... Osborne Paper Mill Equipment Corp.

Rewinder, equipped with circular knives ..... Osborne Paper Mill Equipment Corp.

Saveall ..... Sveen-Pedersen Sales Corp.

Steam boiler, 250-hp ..... Wickes Boiler Co.

Trim blower ..... Westco

Vacuum pumps (4) ..... Nash Engineering Co.

Vickery felt conditioners ..... Bird Machine Co.

Washers (3) ..... Osborne Paper Mill Equipment Corp.

Trends in the pulp, paper and board industry

— an economic review

W. LeROY NEUBRECH*

▶ There is a noticeable continued upward trend in production and consumption of machine-coated printing grades, sanitary papers and special food boards; newsprint consumption was about the same as in 1956. Encouraging signs for 1958.

PRODUCTION OF PAPER and board for the year 1957 will probably total around 30.5 million tons, or about 2.5 per cent below the 1956 output. The moderate 1957 decline may be attributed generally to a reduction in inventories accumulated in 1956 in converting and distribution channels. Actual ultimate consumption of most grades of paper and board in 1957 will probably be about equal to or slightly in excess of that in 1956, when production apparently somewhat exceeded final demand and pipeline inventories accumulated.

The gross national product — the market value of the output of goods and services produced by the national economy — measured in terms of constant 1956 dollars is expected in 1957 to be about the same as or slightly above the record of 1956. The Federal Reserve Board index of industrial production for 1957 will probably be very close to that for 1956. These economic indicators, which in the past have been barometers of total paper and board consumption, would indicate that ultimate consumption of total paper and board in both 1956 and 1957 was probably about the same — in the neighborhood of 35.8 million tons.** Consumption includes imports, particularly of newsprint.

Continued upward trend in some grades

The trends of individual grades, or grade groups, of paper and board have not necessarily followed the generalized pattern described. For example, a continued upward trend in production and consumption in 1957 is indicated for machine-coated printing papers, sanitary papers, and special food boards. Newsprint consumption in the United States in the first 10 months of 1957 remained approximately equal to that of 1956. However, domestic newsprint production increased nearly 14 per cent in the first 9 months of 1957 over the same period of 1956, while imports declined. Newspaper publishers' inventories were up substantially at the end of October over the previous year, an exception to the apparent inventory trend for most other grades.

Prompt mill deliveries demanded

Reports from Department of Commerce field offices in various sections of the country, based upon interviews with producers, converters, printers and publishers (except newspapers), and wholesale merchants, indicate a definite tendency toward reduction over the past several months of above "normal" paper inventories. Both consumers and distributors, according to the reports, are satisfied that the period of shortages or tight supply has ended and are expecting and demanding prompt mill deliveries. This trend is increasing the responsibility of the mills by creating additional manufacturing problems on scheduling shorter grade runs and smaller unit deliveries. One consumer was quoted as saying, "We are now leaving the control of inventory in the hands of the mills". And it is true, according to trade association data, that mills have increased inventories of many grades since the first of the year.

Mill earnings below those of record years 1955-1956

Mill operating costs are reported to continue upward. Higher wages, more employee benefits, increased prices on raw materials, machinery, and equipment, higher transportation rates and larger financing costs on new plant and equipment have resulted in considerable pressure on profits. The majority of mills have reported earnings below 1956. However, the year 1957 can probably be viewed as reasonably satisfactory, in terms of both production and profits, when compared to former years other than the boom years 1955 and 1956.

Encouraging signs for 1958

The extremely cloudy international and domestic economic atmosphere prevailing in October and November suggests delaying estimates concerning the 1958 outlook for paper and board production or demand. However, some straws in the wind seem to offer encouragement. For example, October activity in the nondurable goods industries was maintained at the record September level (according to the FRB seasonally-adjusted index of industrial production), while durables and minerals declined. Similarly, after seasonal adjustments, personal consumption expenditures in the third quarter of 1957 for nondurables advanced $3.4 billion (on an annual

*Assistant Director, Pulp, Paper and Paperboard, Forest Products Division, Business and Defense Services Administration, U. S. Department of Commerce.

**These observations were made in mid-November 1957 and constitute preliminary estimates based upon incomplete data. Unfortunately, current statistics on inventories of paper and board are not available on a tonnage basis for distributors or for many important consumer sectors.

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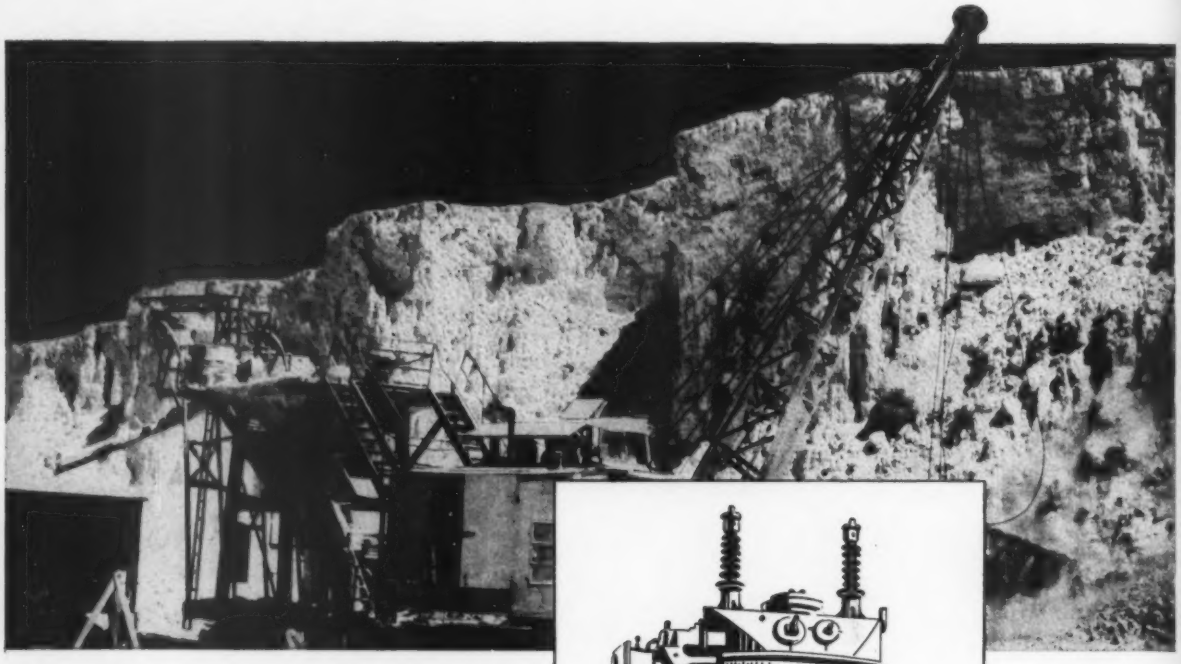

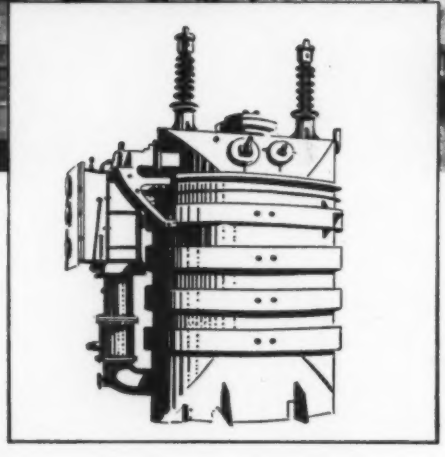

SF_6

A new concept in transformer insulation

GAS INSTEAD OF OIL... *that is headline news!*

Sulphur Hexafluoride is a heavy, non-flammable gas and is both chemically and physiologically inert. These characteristics plus its high dielectric strength pin-pointed the heavy duty transformer field as a logical target. And so it turned out!

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basis) over the second quarter; for services, $1.2 billion; while for durable goods, expenditures remained the same as in the preceding quarter. Should the nondurable sector of the economy maintain or increase its activity, the paper and paperboard industry should be favorably affected, since the broadscale use of paper and paperboard in packaging and shipping of nondurables is a major factor in the demand for millions of tons of production.

Perhaps one of the largest straws in the wind, which might be better described as a "weather vane pointing in the direction of larger sales", is the emphasis being placed by more and more pulp, paper and paperboard companies on market research, new product development, new applications and increased consumption in established uses. For many companies, this is a comparatively new activity that is receiving priority attention from top management, and one which should pay good dividends in adding to markets and consequent production volume.

Five ultimate markets responsible for all consumption

In the special article, "Total Marketing", which appeared in the June issue of *Pulp, Paper and Board Industry Report,* it was stated that there are only five ultimate markets for any final-demand products, and these "are responsible for all consumption of paper and board, yet they actually directly purchase only a very small percentage of primary paper and paperboard but do account for about 15 per cent of final demand for converted products".

From a marketing point of view, the final demand for goods and services of all kinds is the power that winds the spring of the national economic watch. In 1956, the percentage distribution of the total gross national product in 1956 dollars was: Personal consumption expenditures for goods and services, 64.4 per cent; investment expenditures (private and government construction and producers' durable equipment), 17.9 per cent; federal, state, and local government purchases of goods and services (less construction), 16.3 per cent; inventory accumulation, 1.1 per cent, and net exports, 0.3 per cent.

The fortitude and success of producers and distributors in selling their various final-demand goods and services to these five groups of ultimate customers largely determines the volume of demand for paper and paperboard. Theoretically, at least, except for certain converted paper and paperboard products as mentioned previously, only the development of new products or new uses for paper or board would stimulate and increase demand above the volume accounted for by producers and distributors of other final-demand products. Yet, in a practical sense, it is becoming more and more evident that ultimate consumers of other products do "buy" paper or board. The "sales appeal" of the paper or paperboard package is often more evident in selling techniques than the final-demand product itself.

In the case of literally hundreds, if not thousands, of consumer products it is possible to see or examine only the container, not the product itself. The use of incentive colors or pictures, or the vivid printed description of the product enclosed in the container, may mark the success or failure of the total sales effort for such products. This is equally true in the field of advertising, where the technical qualities of the paper may achieve the type of printing or color reproductions that result in successful eye-appeal selling. Whatever the paper and paperboard industry can do, directly or indirectly, to enhance the selling efforts of final-demand products will definitely contribute to its own welfare.

1957-1958 Position of the Paper Industry

(Continued from page 837)

the impression may be gained that the growth has been both slow and small. When placed in its proper perspective, however, it will be noted that it has been quite dramatic.

Since 1947 the consumption of pulpwood has increased from 19.7 to 35.8 million cords, equal to 82 per cent. The principal factors in this growth have been the expansion of the industry in the South and West. Since the softwoods are the preferred species in both of these areas, the use of such species for the United States has risen from 17 to 29.7 million cords, equal to 75 per cent. Over the same period the consumption of hardwood has increased from 2.7 to 6.1 million cords, equal to 126 per cent. More important from an industry and national viewpoint is the fact that in the two oldest pulp and paper producing regions — the Northeast and the Lake States — the increasing shift to hardwoods has enabled mills in those areas to continue to expand and remain competitive with mills located in other areas. Thus, in the Lake States hardwoods now comprise 47 per cent of the wood used, and in the Northeast 30 per cent. Hardwoods also constitute an important source of fiber to mills in the South Central region, constituting 22 per cent of the volume used in that area, wherein a number of hardboard and insulation board mills are located.

While it is true that the use of softwoods in the South has not increased at the rapid rate experienced in the North, it should not be overlooked that the southern mills consume about 50 per cent of the United States total. Further, it may be expected that as the output of end-products favorable to the utilization of hardwood fiber expands, the use of hardwoods in this area will increase more rapidly.

Wood pulp decreased by about 3 per cent

Wood pulp production in 1957 should approximate 21.5 million tons, a decrease of about 3 per cent from the tonnage manufactured in 1956, when — as in the instance of paper and board — output was at an all-time high. Among the grades registering an advance at the conclusion of the first nine months were dissolving and special alpha pulp (7.2%); fully bleached sulfate paper grades (3%), and semi-bleached sulfate (14.6%). The balance of the individual grades showed decreases, the largest of which, on tonnage basis, occurred in unbleached sulfate. However, the basic problem of the industry, in both the United States and Canada, was that the industry's growing capacity was temporarily outstripping demand. Consequently, while output was not down materially, the operating rate for North American mills decreased from 98.4 per cent in 1956 to about 90 per cent in 1957. Further, it has been estimated that if pulp requirements in 1958 continue at the 1957 level, the operating rate will decrease to 83 per cent.

Total United States exports for nine months amounted to 486,000 tons, an increase of 21 per cent over 1956. However, this marked improvement was more apparent than real, for exports in 1956 were unduly low. If the 1957 data are compared with the same period in 1955, it would be noted that the increase over that year is less than 2 per cent. Dissolving pulp exports, representing about 40 per cent of the total for the year to date, have been running about 20 per cent ahead of 1956 and should be at a record high for the year (Table IV).

Special considerations toward improvement of cold soda pulping process*

KENTON J. BROWN
Chemical Engineer
Forest Products Laboratory**
Forest Service U. S. Department of Agriculture

▶ Forced penetration methods, air removal procedures and chemical additives have been tried successfully to achieve a quicker and more uniform dispersion of caustic soda to the chip fibers.

THERE HAS BEEN much evidence during recent months of increasing interest by the pulp and paper industry in the cold soda pulping process. The process, a semichemical-type pulping method developed at the U. S. Forest Products Laboratory, is now being used commercially in the United States to produce pulps from hardwoods for use in the manufacture of corrugating medium and printing papers. A European mill has begun to make toilet tissue from cold soda pulp. Other types of paper and board products may also find use for this pulp, as further research promises to develop the process in the direction of greater versatility and more economical processing.

Basically, cold soda pulping consists of treating chips with a sodium hydroxide solution, draining off excess liquor, and fiberizing the softened chips in a disk mill. The process will operate satisfactorily at or slightly above room temperature. A chemical treatment of 1 to 2 hours is customary for steeps made at atmospheric pressure. The steeping time can be shortened to 30 min. or less by applying hydrostatic pressure to the liquor surrounding the chips in the treating vessel. Possibilities for conducting the process continuously are constantly being explored. It appears from results at the Forest Products Laboratory that cold soda pulps of good quality can be made by applying the caustic soda solution at the same time the chips are being broken down in a refining-type mill (1). In this case the distribution of the chemical to individual fibers is accomplished in a matter of seconds, and the advantages of continuous operation, uniformity and better quality control are realized. An important feature of this particular

*Presented at the Sixth Annual Pulp and Paper Conference held at the College of Engineering, University of Florida, Gainesville, Fla., December 2, 1957.

**Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

Table I—Typical Physical Properties of Unbleached Cold Soda and Groundwood Pulps Used in Printing Paper Production

Species	Freeness (Canadian Standard)	Bursting strength	Tearing resistance	Breaking length	Density	Brightness (G.E. equivalent)	Fiber fraction passing a 200-mesh screen
	Ml.	Pts. per lb. per rm. (1)	Gm. per lb. per rm. (2)	Meters	Gm. per cc.	Per cent	Per cent
		Cold Soda Groundwood Type					
Southern red oak	130	0.30	0.70	3,200	0.50	41	33
North-central mixture (2)	140	0.34	0.70	3,800	0.53	43	30
		Groundwood					
Southern pine	70	0.22	0.59	2,100	0.36	56	45
Spruce	70	0.32	0.60	3,200	0.46	60	45

(1) Ream of 500 sheets, 25 × 40 in.
(2) Chip mixture consisted, by weight, of 50 per cent of soft maple and 10 per cent each of red oak, white oak, elm, ash and yellow birch.

continuous method is that there is no drain-off and subsequent re-use of liquors that are contaminated with dissolved organic matter, which in the batch methods of treating will eventually darken the pulp.

Cold soda pulps that were produced from hardwoods at yields of about 92 per cent are being used as partial substitutes for softwood groundwood pulps in printing papers. Using hardwoods for this purpose appears to be one of the more promising means of meeting the future fiber requirements of the industry. Before this can be done more extensively, however, certain quality problems must be solved. On the credit side, cold soda groundwood-type pulps are usually slightly stronger and higher in freeness than the softwood groundwood pulps they are to replace (Table I). However, they are also denser and contain fewer fine fibers, two factors that make them more transparent than softwood groundwood. Furthermore, cold soda pulps prepared from dense hardwoods are somewhat darker than conventional groundwood pulps and have to be bleached for some uses.

Cold soda pulps for corrugating board are necessarily made stronger than the groundwood-type pulps by using larger amounts of caustic soda. The optimum yield for pulp of this quality is usually 87 per cent. Amounts of material required to produce pulps from certain representative hardwoods by this process (and bleach them in the case of groundwood substitutes) are listed in Table II.

The cold soda process appears to be the least expensive of the chemical or semichemical processes now

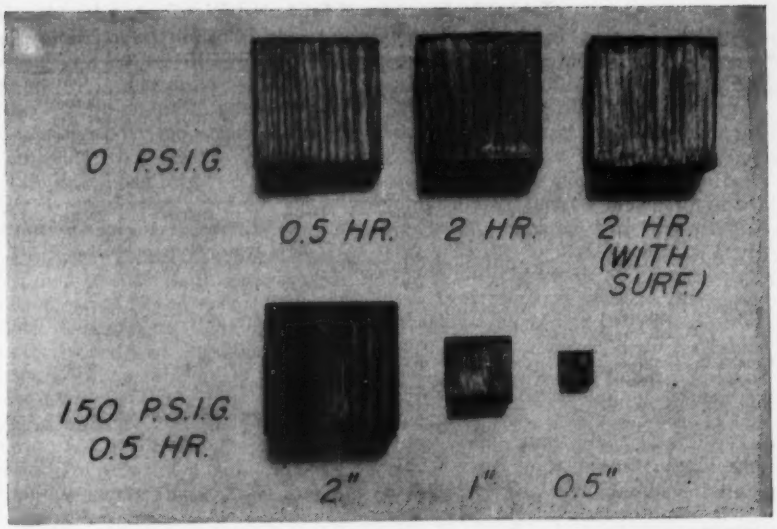

Fig. 1—Split sections of southern red oak blocks showing extent of caustic soda penetration (atmospheric and hydrostatic pressure).

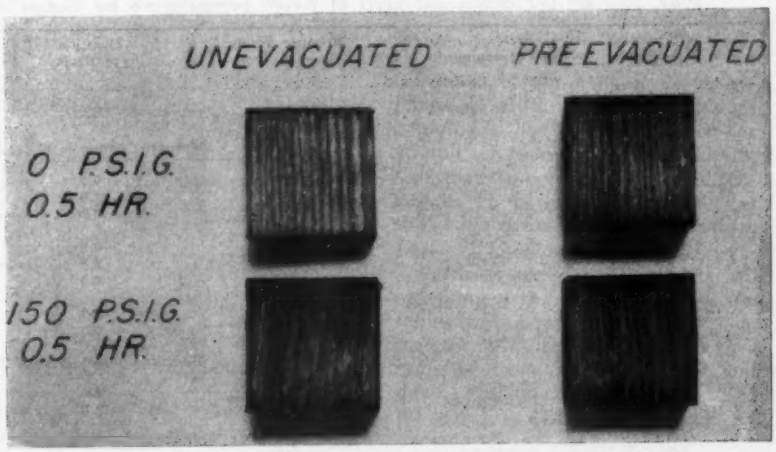

Fig. 2—Effect of caustic soda penetration, with and without vacuum.

Table II—Cold Soda Pulp Manufacturing Factors

Hardwood	Cold soda pulp yield	Materials and power required per ton of air-dry pulp				
		Pulpwood[1]	Caustic soda	Fiberizing energy	Bleaching Line	Chemicals [2] Chlorine
	Per cent	Cords	Lb.	Hp.-days	Lb.	Lb.
Magazine Book-Type Papers						
Southern red oak	92	0.7	175	44	108	90
North-central mixture [3]	92	0.8	165	40	108	90
Aspen	92	1.2	155	39	86	72
News-Type Papers						
Southern red oak	93	0.7	155	40	86	72
Aspen	93	1.2	135	36	48	40
Corrugating Board						
Southern red oak	86	0.8	255	25	....	....
Aspen	87	1.3	230	20	....	....

(1) Based on 83 cu. ft. of solid wood for standard cord of unbarked logs.
(2) Required to prepare calcium hypochlorite and to bleach the pulp in a single-stage procedure. Small amounts of sodium silicate and caustic soda are also needed to control the pH.
(3) Average values for a mixture, by weight, of 50 per cent of soft maple and 10 per cent each of red oak, white oak, elm, ash and yellow birch.

Table III—Examples of Estimated Cost Factors for Manufacturing Cold Soda and Groundwood Pulps for Use in Printing Papers

Process	Species	Pulpwood: Cost per unbarked cord	Pulpwood: Required per ton of air-dry pulp[1]	Cost per ton of air-dry pulp (in slush form): Wood	Caustic soda (at 3.5c per lb.)	Energy[2] for chipping and fiberizing or grinding	Pulping labor ($2 per hr.)	Bleaching chemical, labor and steam	Water (at 5c per 1,000 gal.)	Total (excluding depreciation and overhead)
		Dollars	Cords	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
				Book Paper (Northern Species)						
Cold soda	Birch, maple, oak, elm, ash, aspen	18	0.9	16.20	4.90	5.35	6.00	20.00	0.75	53.10
Groundwood	Spruce (local)	30	1.2	30.00	None	8.50	6.00	6.00	0.50	57.00
				Newsprint (Southern Species)						
Cold soda	Oak, gum	20	0.8	16.00	6.65	5.35	6.00	10.00	0.75	44.75
Groundwood	Southern pine	20	0.9	18.00	None	10.70	6.00	None	0.50	35.20

(1) Based on 83 cu. ft. of solid wood for standard cord of unbarked logs.
(2) Based on cost of 0.75 cents per kilowatt-hour.

Table IV—Effect of Vacuum, Pressure, Surfactant, Particle Size, and Moisture Content on the Absorption of a Caustic Soda Solution (50 grams per liter) at Room Temperature by Cubes of Southern Red Oak Heartwood

Cube dimensions (on each edge)	Pre-evacuation (vacuum)	Pressure drying steep (gage)	Duration of steep	Concentration of anionic	Solution absorbed (per 100 lb. of moisture-free wood)
In.	In. Hg	Psi	Hr.	Gm. per l.	lb.
		Moisture Content — 10 per cent			
2.0	None	0	0.5	None	11.7
2.0	None	0	2.0	None	17.6
2.0	None	0	2.0	10	26.4
2.0	None	150	0.5	None	60.0
1.0	None	150	0.5	None	74.0
0.5	None	150	0.5	None	82.8
2.0	26	0	0.5	None	59.3
2.0	26	150	0.5	None	77.0
		Moisture Content — 35 per cent			
1.0	None	0	2.0	None	15.7
1.0	None	0	2.0	10	20.2
1.0	None	150	0.5	None	23.5
1.0	None	150	0.5	20	32.0

Table V—Effect of Chip Size and Moisture Content on Chemical Consumption, Pulp Yield, and Pulp Strength in the Cold Soda Pulping of Aspen at Room Temperature

Treatment number	Average chip dimension[1]: Width	Average chip dimension[1]: Thickness	Chip moisture content	Caustic soda concentration	Pulping results (per 100 lb. of moisture-free wood): Solution absorbed	Pulping results (per 100 lb. of moisture-free wood): Caustic soda absorbed[2]	Pulping results (per 100 lb. of moisture-free wood): Pulp yield	Pulp properties (at a freeness of 250 ml. Canadian Standard): Bursting Strength	Pulp properties (at a freeness of 250 ml. Canadian Standard): Tearing resistance	Pulp properties (at a freeness of 250 ml. Canadian Standard): Density
	In.	In.	Per cent	Gm. per l.	Lb.	Lb.	Lb.	Pts. per lb. per rm.[3]	Gm. per lb. per rm.[3]	Gm. per cc.
				2 Hours at Atmospheric Pressure						
922	1	1/8	12	25	—	8.5	91.2	0.53	0.64	0.64
944	1/16	1/16	12	25	—	11.4	87.9	0.47	0.64	0.63
				5 Min. at 150 PSI (gage) After Vacuum						
2824	1	1/8	6	49	241	11.4	91.3	0.49	1.20	0.62
2855	1/16	1/16	7	46	301	17.8	87.0	0.44	0.65	0.59
				10 Min. at 150 PSI (gage) After Vacuum						
2817	1	1/8	7	50	283	16.9	89.2	0.51	0.75	0.64
2800	1	1/8	46	49	176	10.9	92.4	0.51	0.88	0.66

[1]Constant length in the fiber direction was 3/8 in.
[2]Includes consumed caustic soda and the unused chemical left in the chips after the treatment.
[3]Ream of 500 sheets, 25 × 40 in.

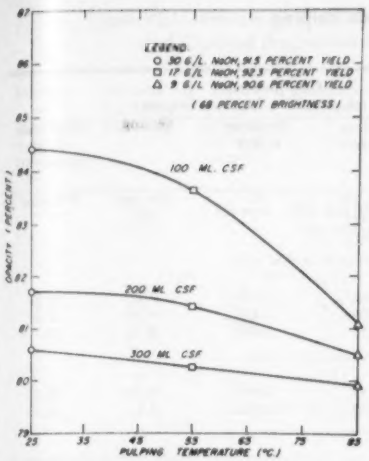

Fig. 3—Relations between pulping temperature, freeness and opacity.

available. Examples of estimated costs of making cold soda and groundwood pulps are given in Table III. In comparison to softwood groundwood pulp, the extra cost for chemicals used in producing hardwood cold soda pulp in the northern United States would be more than offset by savings in wood and fiberizing energy costs. Energy required to fiberize cold soda pulps made from southern oaks and gums is about one half of that used to grind southern pines; but in this case the pulpwood costs are about the same. The total cost of manufacturing pulp by these two methods in the southern United States would be nearly the same if the cold soda pulp could be used unbleached.

Operating costs in the cold soda process could be lowered if shorter treating periods and more efficient use of the chemical could be accomplished. This means using improved methods to disperse minimum amounts of caustic soda quickly and uniformly to all of the fibers in the chip. Some factors to consider in experimentation on this problem of liquor distribution are the effects of using forced penetration mechanisms, air removal procedures and chemical additives in applying the caustic soda solution. The size and moisture content of the chips are also important factors.

Hardwoods used in these experiments

Tests were made on southern red oak and eight other hardwoods. The other hardwoods, representative of the forests in the northern United States, included aspen and paper birch (which were tested individually) and a mixture of soft maple, red oak, white oak, elm, ash and yellow birch. All the pulpwood was peeled and, unless otherwise stated, converted into standard-sized ⅝-in. chips for pulping experiments. Blocks used for penetration studies were cut from the heartwood of southern red oak logs.

Liquor absorption variables

Pressure. These experiments were designed to study both natural penetration and forced penetration at room temperature. The blocks of southern red oak heartwood were treated with a solution of 50 grams of caustic soda per liter at atmospheric pressure and under a hydrostatic pressure of 150 psi (gage) for periods of 0.5 and 2 hours at 25°C. Previous penetration studies made

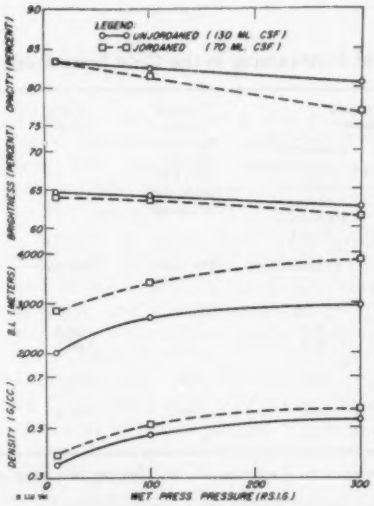

Fig. 4—Effect of jordaning on optical and physical properties.

with caustic soda liquor on aspen blocks indicated that 150 psi (gage) was the most practical pressure for hydrostatic treatment in this process (2).

The blocks were cubes with sides of 0.5, 1 or 2 in. Treatments were made on several samples at a time (usually five) placed in a wire basket that was suspended in a stainless steel autoclave of 0.8-cu. ft. capacity. The amount of solution absorbed by the blocks was determined from the difference in weight before and after the treatment. The extent of penetration through the blocks was observed by splitting them longitudinally and dusting phenolphthalein powder on the face of the split section to clearly outline the presence of alkali. Typical sections of blocks from these tests are shown in Fig. 1.

As shown in Table IV, 2-in. blocks of red oak heartwood with a moisture content of 10 per cent picked up five times more liquor in 0.5 hr. at 150 psi (gage) pressure than they did at atmospheric pressure. The blocks soaked for 2 hrs. at atmospheric conditions absorbed only 30 per cent as much liquor as those impregnated with hydrostatic pressure for 30 min. Results of tests made on blocks that contained 35 per cent moisture showed the same beneficial effects of increasing pressure but to a lesser degree (Table IV).

Vacuum. A vacuum of 26 in. of mercury was drawn on the 2-in. blocks and held for 5 min. before the caustic soda liquor entered the autoclave. The extent of penetration into the blocks that contained 10 per cent moisture was increased considerably by pre-evacuating the wood before steeping at atmospheric pressure, as shown in Fig. 2. Pre-evacuation also improved results of the hydrostatic treatment but to a lesser extent. Absorption values in Table IV show that removing the air from the wood before steeping at atmospheric pressure was as effective as applying a hydrostatic pressure for 30 min. Recent cold soda pulping tests made on green aspen that contained 47 per cent moisture also showed benefits from preevacuation (3).

Particle size. Decreasing the dimensions of the red oak cubes in the range from 2 in. on a side to 0.5 in. increased the liquor absorption in a range of from 60.0 to 82.8 per cent during treatments of 30 min. at 150 psi (gage) (Table IV). This in-

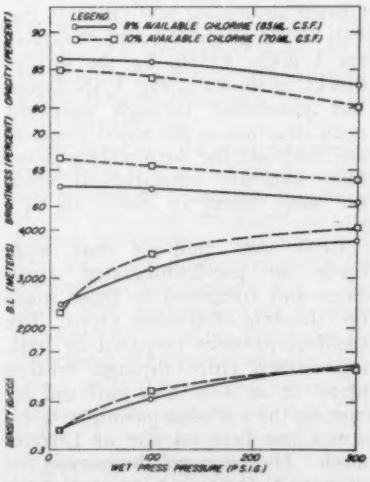

Fig. 5—Affect of bleaching chemical on optical and physical properties.

Table VI — Effect of Certain Surfactants in the Cold Soda Pulping of Southern Red Oak

Surfactant		Pulping results (based on 100 lb. of moisture-freewood[1]			Fiberizing energy	Pulp properties (150 ml. Canadian Standard freeness)				
Type	Concentration	Liquor absorbed	Caustic soda absorbed[2]	Pulp yield		Bursting strength	Tearing resistance	Breaking length	Density	Brightness (G.E. equivalent)
	Gm. per l.	Lb.	Lb.	Lb.	Per cent	Pts. per lb. per rm.[3]	Gm. per lb. per rm.[3]	M.	Gm. per cc.	Per cent
				Batch Treatments[4]						
None (control)		99.2	12.5	90.1	100	0.16	0.45	1,770	0.42	35.9
Nonionic	20	87.6	10.0	89.9	103	0.21	0.51	2,430	0.40	37.9
Anionic	20	92.0	11.0	90.7	105	0.22	0.53	2,400	0.42	35.7
				Continuous Treatments[5]						
None (control)		231	11.3	.....	100	0.25	0.65	3,000	0.46	40.2
Anionic	5	234	11.5	.....	101	0.33	0.59	3,500	0.51	42.4

[1]Wood treated contained 23 per cent moisture.

[2]Includes consumed caustic soda and the unused chemical left in the chips.

[3]Ream of 500 sheets, 25 × 40 in.

[4]Made in a digester at 28°C and 150 psi (gage). The concentration of caustic soda was 50 grams per liter and the treating time was 30 min.

[5]Made in a roll mill at 30°C and a production rate of 350 lb. of chips (moisture-free basis) per hour. The concentration of caustic soda was 51.5 grams per liter.

Table VII—Effect of Presteaming in the Cold Soda Pulping of Paper Birch

Treatment number	Presteaming conditions	Caustic soda treatment[1]		Treated chips having a density over 1.05 grams per centimeter	Pulp yield	Pulp strength properties (250 ml. Canadian standard freeness)		
		Average temperature	Chemical consumed by reaction (mosture-free wood basis)			Bursting strength	Tearing resistance	Density
		°C	Per cent	Per cent	Per cent	Pts. per lb. per rm.[2]	Gm. per lb. per rm.[2]	Gm. per cc.
2896,2913	None (control)	55	8.6	75	86.3	0.70	0.87	0.63
2891,2928	0.5 hour at 5 psi (gage)	58	9.5	100	86.3	0.74	0.74	0.62
2903,2919	1 purge[3] at 50 psi (gage)	63	8.1	100	83.1	0.58	0.96	0.61
2912	2 purges[3] at 25 psi (gage)	55	8.2	100	79.6	0.65	0.80	0.61

[1]Chips were steeped for 1.5 hrs. at atmospheric pressure in a solution of 50 grams per liter of caustic soda.

[2]Ream of 500 sheets, 25 × 40 in.

[3]Steam released immediately after reaching indicated pressure.

creased absorption was probably due only to the greater amount of surface for a given weight on the smaller blocks; as shown in Fig. 1, the liquor had penetrated through only the open structure of the wood (vessels) and had left the surrounding dense fiber structure untreated to about the same extent in blocks of each size.

Cold soda pulping tests were made on pre-disintegrated aspen chips and compared to those made on standard full-sized chips. The small chips were prepared by passing normal chips through breaker plates in an 8-in. disk mill and accepting the particles passing a 1/8-in. screen but held on one of 1/16-in. mesh. The average dimensions of these particles were 1/16 in. in both the radial and tangential directions and 5/8 in. in the longitudinal fiber direction. Comparisons of pulping tests made at both atmospheric pressure and hydrostatic pressure after pre-evacuation on both sizes of chips are given in Table V. After 2 hrs. of steeping at atmospheric pressure, the liquor penetration in the small particles was complete, but the larger chips had dry centers. Penetration was found to be complete in both cases after the forced penetration treatments. Under both conditions of pulping the amount of liquor absorbed, and consequently consumed, was increased considerably by decreasing the chip size. The increased consumption of chemical decreased the pulp yield about 4 per cent. Preparing the small chip particles probably did some damage to fibers, since the pulps prepared from them had bursting strengths about 10 per cent lower in each case (Table V).

Moisture content. As shown in Table IV, when the moisture content of the red oak 1-in. blocks was decreased from 35 to 10 per cent, the amount of liquor absorbed in 30 min. at 150 psi (gage) was increased about three times. The effect of cold soda pulping of a decrease in the moisture content of aspen chips from 46 to 7 per cent is shown in Table V. The dryer chips absorbed 60 per cent more liquor and produced 3.5 per cent less pulp after being treated 10 min. at 150 psi (gage) following preevacuation. The difference in moisture content had no significant effect on pulp strength, which substantiates results of other experiments on green and

Table VIII—Effects of Disk Mill and Beater Refining on Physical and Optical Properties of Bleached Cold Soda Pulp[1]

Number of passes through disk mill	Freeness (Canadian standard)	Fiber fraction passing a 200-mesh screen	Bursting strength	Tearing resistance	Density	Brightness (G.E. equivalent)	Opacity (37-lb. sheet[2])
	Ml.	Per cent	Pts. per lb. per rm.[2]	Gm. per lb. per rm.[3]	Gm. per cc.	Per cent	Per cent
			Disk Mill-Refined Cold Soda				
1	280	23.7	0.12	0.29	0.30	67.9	80.9
2	240	26.5	0.15	0.38	0.32	67.7	81.2
3	120	28.0	0.24	0.55	0.38	68.3	83.0
			Beater-Refined Cold Soda[3]				
3	65	26.0	0.45	0.63	0.59	69.4	81.0
			Commercial Bleached Groundwood[4]				
	70	43.4	0.27	0.55	0.49	69.0	92.7

[1]Prepared from a mixture of six north-central hardwoods by steeping the chips for 1 hr. at 150 Psi (gage) and 23°C in a 14-cu. ft. digester with a caustic solution of 25 grams per liter concentration (treatment No. 4190).
[2]Ream of 500 sheets, 25 × 40 inches. Test sheets weighing 37 lb. per ream were pressed at 60 psi (gage).
[3]Pulp from third pass through the disk mill was refined in a 1.5 lb. test beater.
[4]Prepared from an equimixture of spruce and aspen.

air-dry aspen reported previously (5).

Surfactants. Standard-sized chips and 1-in. cubes prepared from southern red oak were treated with caustic soda liquors containing varying concentrations of several different types of surface-active agents to determine their effects on the rate of penetration and pulping characteristics in this process. Examples of typical results are given in Tables IV and VI. Adding 10 grams per liter of an anionic surfactant to the liquor increased by about 50 per cent the amount of liquor absorbed by the air-dry blocks during 2 hrs. atmospheric steeping. Blocks containing 35 per cent moisture picked up only 30 per cent more liquor with the surfactant present under similar conditions.

In contrast to the above, the addition of surfactants of both anionic and nonionic types to liquors used in treating red oak chips (containing 23 per cent moisture) decreased slightly the amount of liquor absorbed. The presence of the surfactants did not affect pulp yield, nor did it change the chip-softening effect (measured by the fiberizing energy) of the caustic soda liquor. The strength properties of cold soda pulps made by both the batch and continuous methods, using conditions described in Table VI, were increased slightly by the addition of surfactants. Adding 5 grams per liter of an anionic surfactant to the liquor in the continuous system increased the pulp brightness from 40.2 to 42.4 per cent. Pressing the treated chips containing the surfactant before the fiberizing operation increased the brightness still further to 43.7 per cent.

Results of other block tests (not tabulated here) with both anionic and nonionic surfactants showed that in each case a concentration of 10 grams per liter was more effective than either 5 or 20 grams per liter. In a cold soda pulping solution, use of 10 grams per liter of a surfactant that cost 20 cents per lb. would increase the cost of a ton of cold soda pulp about $4.50.

Pre-steaming. The effectiveness of using steam to replace air in chips, and thereby improve penetration in the cold soda process, was investigated. Each of the presteaming methods described in Table VII increased the rate at which caustic soda liquor penetrated into paper birch chips, but only the mildest conditions of steaming gave satisfactory pulping results. Applying steam at a pressure of 5 psi (gage) for 30 min before the caustic soda treatment did not change the pulp yield but did increase the bursting strength about 5 per cent in comparison with a treatment made at 55°C without pre-steaming. Using the technique of "purging" the chips with steam at pressures of 25 and 50 psi (gage) seriously decreased the pulp yield and strength (Table VII). The increased darkening of the pulp at pulping temperatures higher than normal would probably limit this method to production of pulp for such products as corrugating board.

Optical properties

In making printing papers that contain cold soda pulp the opacity, brightness and color of the paper depend on the careful control of conditions during the pulping, refining, bleaching and papermaking operations. Since each step in preparing the pulp and making the paper has a number of variables, of which are interdependent, the problem of producing paper with optimum optical properties from cold soda pulp in complex. The following discussion contains typical examples of basic information needed on the effect of the variables before the proper paths toward improvements can be chosen.

Pulping temperature. An investigation was made to determine the effect of the treating temperature on the opacity and strength of cold soda pulps produced at the same level of yield. Chips from a mixture of six hardwoods typical of the north-central region (50 per cent, by weight, of soft maple and 10 per cent each of red oak, white oak, elm, ash and yellow birch) were treated with varying concentrations of caustic soda at different temperatures. A caustic soda concentration of 30 grams per liter at a temperature of 25°C produced a yield of 91.5 per cent; 17 grams per liter at 55°C produced a pulp yield of 92.3 per cent, and 9 grams per liter at 85°C provided a yield of 90.6 per cent. The cold soda pulps produced from these treatments were refined by circulation through an 8-in. disk mill, and samples were taken at freenesses of approximately 300, 200 and 100 ml. (Canadian Standard). Each pulp sample was bleached with calcium hypochlorite at both a 6 and 12 per cent available chlorine level. Handsheets prepared from the pulps at a weight of 37 lb. per ream (500 sheets, 25 × 40 inches) were tested for opacity, brightness and strength. Screen fractionation tests were also made on each pulp.

The results of the study are shown graphically in Fig. 3. Opacity values interpolated at a constant brightness of 68 per cent decreased as the pulping temperature was increased. This effect was most pronounced for the pulps of low freeness. Fig. 3 also shows that decreasing the freeness increases the opacity. For example, decreasing the freeness of pulp (produced at 25°C) from 300 to 100 ml. increased the opacity of the sheet about 4 percentage points at a brightness of 68 per cent.

Other results obtained in this study were as follows: (1) Opacity,

at a constant brightness, increased as the fraction of fine fibers was increased. (2) At an average pulp yield of about 91.5 per cent, the amount of caustic soda consumed was not changed by variations in treating temperature. (3) The brightness of the unbleached pulps decreased from about 40 to 37.5 per cent as the pulping temperature was increased in this range.

Refining. According to Parsons (4), the amount of light scattered by pulp in a sheet can be increased by increasing the unbonded fiber surface area in the sheet. This increase in light scattering power and resultant increase in opactiy could be presumably brought about by either (a) cutting the fibers into smaller particles to increase the surface area or (b) using less pressure in wet pressing the sheet to decrease the bonded surface. The purpose of the work reported in this section was to determine the suitability of three types of pulp refiners to increase opacity as in (a).

Disk milling: Cold soda pulp produced from the mixture of six hardwoods under conditions given in Table VIII was refined to various freenesses by recycling through a 36-in.-diameter double disk mill. Decreasing the pulp freeness in this manner within a range of from 280 to 120 ml. increased the amount of fine fibers passing through a 200-mesh screen in a range of from 23.7 to 28.0 per cent. After the pulps were each bleached with 12-per cent available chlorine in the form of calcium hypochlorite, tests made on handsheets showed that refining in the disk mill was effective in increasing both the opacity and strength of the pulp (Table VIII).

Beating: The bleached pulp from the last stage of refining in the disk mill was beaten in a test beater of 1.5-lb. capacity until its freeness was about the same as that of commercial book-grade groundwood pulp. Beating increased the strength and density of the cold soda pulp considerably but decreased its opacity 2 percentage points (Table VIII). The decrease in amount of fines after beating might be partly caused by increased coagulation of hydrated fibers in the screen classifier.

Jordaning: Bleached cold soda groundwood-type pulp prepared from a mixture of southern red oaks was subjected to a single pass through a laboratory jordan using a moderate amount of pressure. Handsheets made from the pulps before and after jordaning were wet pressed at pressures of 10, 100 and 300 psi (gage). Refining this pulp in the jordan decreased its freeness from 130 to 70 ml. and also decreased both the opacity and brightness of sheets pressed at given pressures, as shown in Fig. 4. This refining action increased both the density and strength (as measured by breaking length) of the pulp. If the curves in Fig. 4 are used to compare the jordaned and unjordaned pulps at constant values of density and brightness in a range of wet press pressure of from 100 to 150 psi (gage), this refining action appears to have had no effect on opacity.

Brightening. The typical effect on opacity of brightening cold soda groundwood-type pulp is shown in Fig. 5. Increasing the amount of applied available chlorine from 8 to 10 per cent (based on the moisture-free weight of the pulp) in bleaching a southern red oak cold soda pulp with calcium hypochlorite decreased its freeness from 85 to 70 ml. and increased its brightness about 3 percentage points. At a given wet press pressure, this increase in brightness was accompanied by a decrease in the opacity of the handsheet of about 2 percentage points, as shown in Fig. 5. Increased brightening strengthened the pulp slightly (as measured by breaking length) without changing its density.

Wet pressing. As indicated in Figs. 4 and 5, increasing the pressure during the wet pressing of cold soda pulpsheets increases both their densities and strength properties but makes them darker and more transparent.

Pulp color. As mentioned before, treating wood with caustic soda at low temperatures gives the fibers a yellowish cast that persists even after bleaching. This color becomes noticeable in printing paper if more than about 25 per cent of cold soda is present in the sheet. An experiment made on aspen sawdust to determine the cause of the yellowing involved treating samples with a 50-gram-per-liter solution of caustic soda for 2 hrs. at atmospheric conditions after they had been extracted successively with ether, alcohol-benzene and hot water. Treatment of the sawdust after each extraction produced the same characteristic yellow color as treatment of an unextracted sample. But the color of a sample of Cross and Bevan cellulose prepared from the sawdust did not change after a similar treatment with caustic soda. This result supports the common belief that the yellow color is produced by the reaction of the alkali with lignin.

Multi-stage bleaching might be an effective way to remove the yellow color from cold soda pulp, but it would probably be costly. Experience has shown that the brightness and degree of yellowness of cold soda pulp depend partly upon the extent of washing given the pulp. In one series of experiments the brightness of unbleached aspen cold soda pulp was increased from 49.0 to 54.3 per cent by pressing out some of the colored liquor from the treated chips by a single pass through a screw press before the chips were fiberized in the disk mill. Bleached pulp produced from the pressed material appeared to be somewhat less yellow. The use of surfactants in conjuction with washing operations also seems to have promise for improving the color of cold soda pulp.

Conclusions

It may be concluded that:

(1) The rate of distribution of caustic soda solution to the centers of hardwood chips during pulping by the cold soda process can be accelerated by either pre-evacuating the treating vessel, increasing the hydrostatic pressure during steeping or decreasing the chip size.

(2) Air-dry wood absorbs more liquor, consumes more chemical and produces less cold soda pulp at a given level of strength than green wood.

(3) Optimum treating temperature in the preparation of cold soda groundwood-type pulps is about 25°C from the standpoint of opacity and color.

(4) The opacity of bleached cold soda pulp can be increased by disk mill refining.

(5) If it is important to preserve opacity, cold soda pulps should be bleached only to the minimum acceptable brightness, and their densities should be kept at the minimum level necessary to obtain the desired strength in the paper.

(6) The addition of surfactants to cold soda pulping liquor accelerates its penetration into wood with low moisture content and also improves washing operations.

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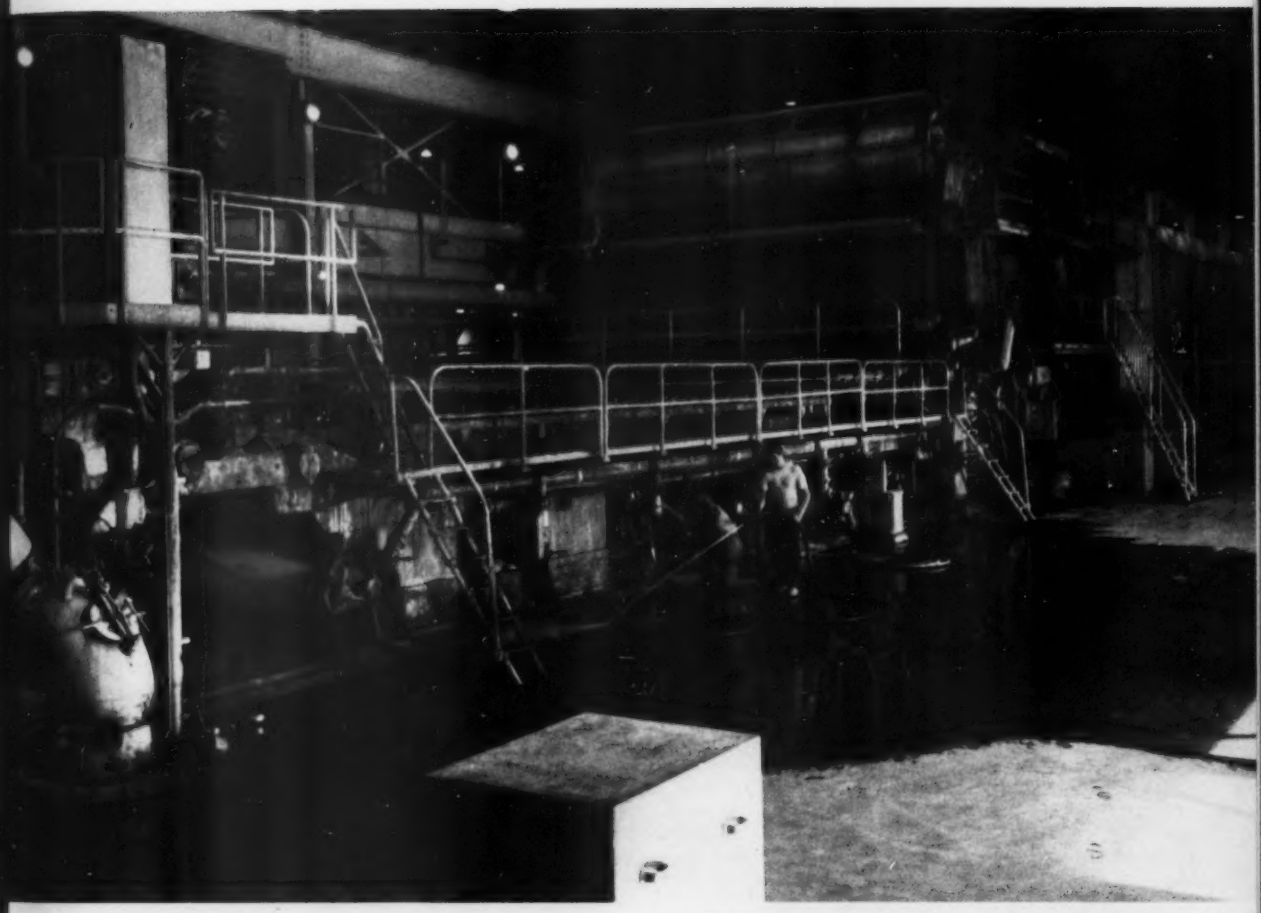

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Functional coatings and adhesives*

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Functionally pre-coated board has the advantage of making the final converting process more economical in providing a paper surface that requires only a lightweight overcoat for the final end use.

THE MANUFACTURE of bleached board is one of the fastest growing areas in the American paper industry. While there are many factors that have contributed to this rapid expansion, the factor chiefly responsible is the increasing demand for better package appeal to influence the "pick-me-up" instinct of the shopping housewife in the supermarket.

An even faster growth is evident in a directly related industry—the field of protective packaging. For example, the past five years have shown a growth of over 1000 per cent in the consumption of polyethylene film. The use of cellophane has grown by 100,000,000 lbs. over the same period. We have also seen the introduction of new films such as Pli-O-Film, Saran, Milar, polystyrene and many others.

While we do not expect bleached board to completely replace these flexible protective films, their growth figures do demonstrate dramatically the increasing need in the paper converting industry for packaging materials that will provide functional or protective properties as well as eye appeal. How, then, can the bleached board industry supply the converter with more versatile, more useful board? One method of doing this is through functional coatings applied on the paper machine.

Functional coatings

There are basically two approaches to the field of "functional" coatings. The first is to apply on-machine coatings, which are of themselves greaseproof, waterproof and possessive of low moisture-vapor transmission for packaging candy, tobacco products, meats, frozen foods, dairy products and other items such as tea, coffee, powdered mixes, etc. Such functionally coated boards would also be suitable, without further treatment, for expendable items such as non-stain coffee cups, paper plates, spiral-wound tubes, etc. At present, this approach is not being undertaken in on-machine operations, since there are not yet available proved coating materials that possess all the necessary machine requirements.

The second and more immediately practical approach is for on-machine functional coatings with less demanding requirements. Functionally, coated board of this type may be further treated by the converter to develop the necessary characteristics for his end requirement. This type of board is being produced now by a number of paper companies where on-machine applications of the proper coating systems provide, at low cost, considerable improvement over standard board in grease resistance, printability, nonstaining properties and excellent holdout for further treatment with more expensive lacquer and emulsion resin systems.

This type of functional coating is rapidly gaining use in a wide variety of fields, not only because of its functionally superior properties, but because it permits improved economy even in the face of the intitially higher cost of the board. To be more specific, one of the pioneers in the use of this type of board has been the paper cup industry. This industry has been faced with serious competition from molded plastics. Paper cups made from conventional bleached board for hot coffee and similar drinks possess the disadvantages of paper taste and unappetizing staining. This competition was finally met by the paper cup converter with the use of plastic-coated cups. Several methods have been devised to apply these expensive plastic coatings to the paper. Most of the methods involved entail additional handling operations, since the application of rather large quantities of expensive plastics in solvent or emulsion systems is required to obtain the proper quality of feel, glossy appearance and stain resistance with coatings free from pinholes.

More recently, the functional on-machine coating of bleached board has resulted in what appears to be a more economical converting process. Instead of starting with conventional bleached board and applying one heavy coat of resin in the converting operation, a functionally pre-coated sheet is used. The pre-coat, which serves as a holdout or barrier coat, does perhaps 50-85 per cent of the required job. Therefore, a very light application, ½ to 1 lb. per 1000 sq. ft. of the conventional plastic resin used as an overcoat, will produce a better and more economical cup. In addition, since such light weight overcoats are involved in the final treatment, drying problems are almost eliminated, and new low-cost methods of application can be considered by the converters.

Almost any type of machine coating will produce an improved effect on the conversion coating operation. However, it has been found desirable to use a resin emulsion or latex product as the base ingredient in the coating. Starch alone as a binder for these coatings is usually not suitable since its poor water resistance does not permit use of the wet stack to obtain the high finish desired. Casein-based coatings are feasible in this respect but have insufficient continuity to offer high barrier resistance to solvents or water-base conversion overcoats. Resin-pigment combinations appear to be ideal and usually have small amounts of thickeners added to minimize coating penetration into the base stock. Where water resistance is important, ammonia-cut casein can be used as the thickener.

Effectiveness of functional coatings

The effectiveness of these barrier coats is shown in Fig. 1. The board samples shown in this illustration were prepared by dipping them in staining solution for 1 min. in order to determine their individual stain resistance. The more heavily stained or colored samples indicate poor holdout

*Adapted from a paper presented at the Packaging Institute Conference, New York.

properties. The resin overcoatings in all cases were applied from emulsion systems.

Sample 1 represents standard uncoated stock, and naturally its stain resistance is very poor.

Sample 2 represents uncoated stock on which a converter has applied a heavy plastic coating to produce stain resistance. A minimum of 9 to 12 lbs. of dry resin per ream (3000 sq. ft.) is needed to obtain good stain resistance as shown.

Sample 3 was prepared in the same manner as Sample 2 except that only 3 lbs. of resin per ream was applied by the converter. It will be noted that this light coating produced virtually no stain resistance.

Sample 4 represents a combination of a functionally machine coated board and a 3-lb. resin overcoat per ream as in the case of Sample 3. Sample 4 possesses stain resistance superior to that of Sample 2 prepared by the converter with a heavy coating only.

Economic advantage of functional coating

Let us now look at the favorable economic picture of functionally-coated stock. As was demonstrated with Samples 2 and 3, it is often necessary for the converter to apply a heavy plastic coat of 12 lbs. of dry resin per ream in order to obtain satisfactory stain resistance. At $0.50 a dry pound, this amounts to $6.00 per ream for the resin coating. When functionally-coated stock is employed, as with Sample 4, the same job is accomplished with only 3 lbs. of resin overcoat per ream at a cost of $1.50 for the overcoat. This leaves $4.50, which should be sufficient to cover additional costs to the paper manufacturer for the machine coating and provide interesting cost savings to the converter.

Since functional coatings permit the use of lightweight overcoats, it is only reasonable to assume that further savings may be realized through more economical application methods.

The coating demonstrated here was made on an air-knife coater. Equally good coatings have been made by roll coater. Where air-knife coaters are involved, a vinyl acrylic copolymer latex is utilized. In the case of the roll coating, polyvinyl acetate emulsions may be successfully employed as the resin system. In addition, work with the vinyl acrylic copolymer at the size press shows promise of leading to satisfactory functional coatings at this station.

While Fig. 1 demonstrated the effectiveness of the pre-coat in producing stain-free plastic cups with minimum conversion coat-weights, it is certainly obvious that this machine-coated stock would be ideally suited for many other purposes. For example, considerable improvement may be found in the subsequent application of many types of resins, waxes or other materials in the production of various specialty boards. Some of the grades envisioned are paper plate stock, folding boxboard, spiral-wound containers for packaging ice cream, cottage cheese, etc. Furthermore, machine-coated base stock of this type may be necessary to economically produce pin-hole-free moisture vapor barrier resin coatings.

Functional coating on the size press

Coaters on bleached board machines are relatively few in number, whereas almost every machine producing bleached grades is equipped with a size press. If it were possible to apply these functional or barrier coatings at the size press, the economic picture would be so sound that large market potentials would immediately be developed since only a very moderate mark-up over conventional bleached grades would be required.

Many of the same difficulties that are common to size press coating of regular offset paper grades are also encountered with bleached board. These difficulties include preferential absorption and the necessity of using low-viscosity coating formulations in order to reduce patterning and to account for reduced capacity for working the color at this station. In addition to these common difficulties, functional coating characteristics such as grease- and stain-resistance require a pinhole-free application, which is virtually impossible to obtain by size press application alone. It should also be kept in mind that the size press must continue to serve its normal func-

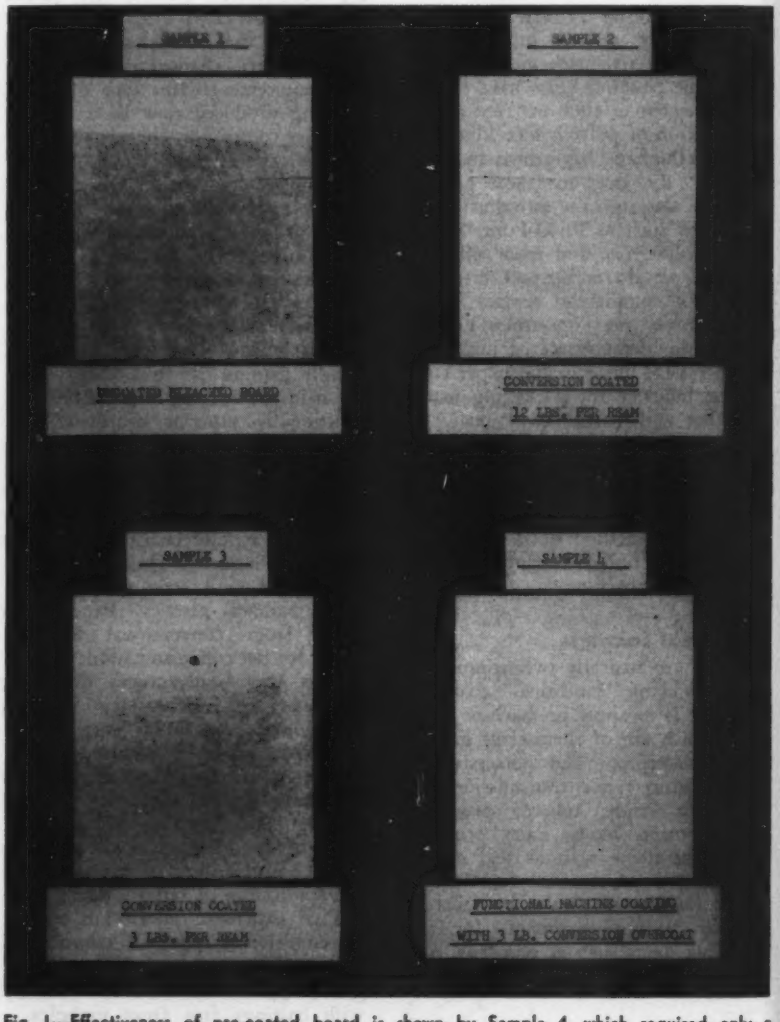


Fig. 1—Effectiveness of pre-coated board is shown by Sample 4, which required only a 3-lb. overcoat.

tion of improving the strength characteristics of the board.

These conditions differ sharply from those which are evident with a machine coater. The majority of mills with coating apparatus on bleached board machines have placed them at the end of the paper machine. As a consequence, it is possible to pre-treat the board at the size press with conventional sizing agents to provide the desired finish and strength. More important, the surface has been sufficiently treated to make it reasonably nonabsorbent to the coating, thus permitting continuous filming of the coating formulation to produce a minimum of pinholing.

In spite of the shortcomings of direct size press application as compared to a regular machine coater, there are a number of steps that can be taken to insure successful coating at this station. The first of these is the application of a surface size at the smoothing press or breaker stack ahead of the size press. An arrangement of this sort helps to prevent excessive absorption into the board of the low-viscosity coating to be applied at the size press. Furthermore, by making use of low—viscosity, high-solids resins formulations, additional treatment may be carried on at the calender stack. By utilizing all of these stations to the utmost, board can be produced by size press coating that definitely shows promise of approaching the required characteristics of the functional coating.

Perhaps the greatest aid to sucessful size press coating has been the introduction of latices such as the vinyl acrylic copolymer as pigment binders. These resins have made possible formulating qualities far superior to ordinary materials in overcoming the previously mentioned difficulties.

Since the size press coating formulation is principally composed of vinyl acrylic copolymer latices, thickeners and pigment, it produces a coating ideally suited for offset printing. In addition, treatment at the size press results in a two-side coated sheet, which, of course, offers the advantage of improving the print quality of the opposite side while imparting functionalism to the other. The result would be a utility coated board off the paper machine that is suitable for practically any conversion operation.

Adhesives

The necessity for a simultaneous discussion of bleached board coating and adhesives is quite obvious. As more h i-g h l y water- and grease-resistant surface treatments come into common use, such as the functional coatings, the problem of adhering them during the fabrication of boxes, cartons and cups will naturally be somewhat more difficult.

Constant thought must be given during the development of new polymers to the adhesive problems, which might result from their use within the paper industry. Consequently, considerable attention is given to this phase of the problem during the development stages of the coating work. On the other hand, there is also available at National Starch Products both the facilities and the know-how needed to cope with adhesive problems that might occur as a result of the use of these base polymers in functional or barrier coatings.

Nearly everyone, whether paper manufacturer or converter, has at one time or another encountered adhesive problems with what we might term "difficult stock". So that we may all acquire a little better understanding of some of the guiding principles of adhesion, it might be well to mention a few of the more general aspects of this problem.

An adhesive is a substance applied as a thin intermediate layer between two surfaces. "Adhesive" is a general term that applies to cements, paste, gums, animal glues and mucilage. Practically all commercial adhesives are polymeric in nature. There are two broad types of adhesion: mechanical adhesion, which depends upon penetration of a porous surface; and specific adhesion, where molecular forces, either primary or secondary, are relied upon rather than mechanical anchorage.

Where porous, penetrable surfaces such as wool, cloth, ceramics and paper are involved, mechanical adhesion is most important. In bonding the surfaces of conventional bleached board, mechanical adhesion is involved since penetration into the stock is accomplished. Thus, the strength and plasticity of the adhesive film is not the primary consideration. As a result, low-priced starch-based adhesive can normally be used.

Adhesion resulting from molecular attraction is required for impenetrable surfaces such as glass, polished metal or plastic. Theoretically, unbalanced forces are present at the surface of a material that render it more active than the interior of the mass. Specific adhesion, therefore, involves intermolecular forces at the inter-face between the adhesive and the substrate.

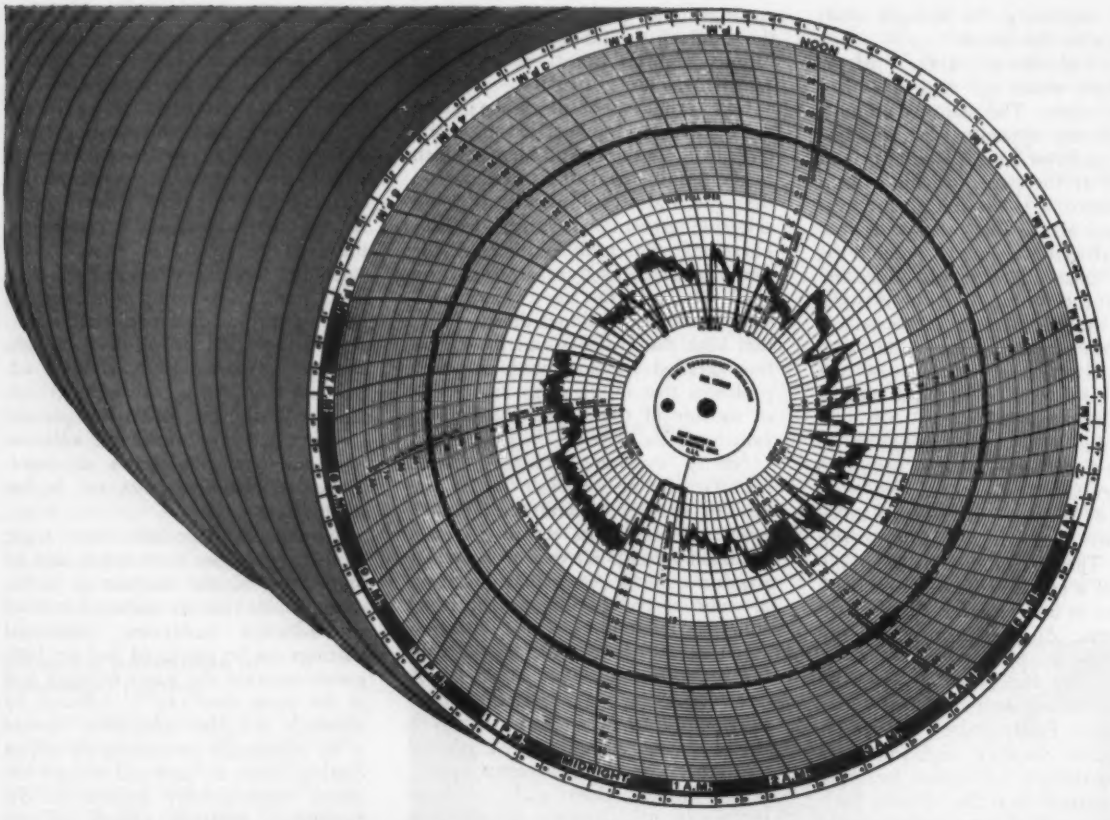
Adhesion of functionally-coated board creates a rather paradoxial problem in this respect. On the one hand, we are attempting to make as plastic a surface as possible, one which is impenetrable to water and oils. At the same time, we want to keep it within the bounds of mechanical adhesion, where low-cost adhesives may be utilized such as in the case of conventional bleached board. If this is not accomplished and the coating produced possesses completely the characteristics of a plastic or non-porous surface, we are forced to rely upon specific adhesion. With a coating of this type we become dependent upon surface phenomena where the adhesive itself lies as a bonding film between the two surfaces to be adhered. Thus, we must expect to utilize a high-strength plastic polymer as the adhesive base, which will remain relatively flexible in order to prevent cracking or disruption of the adhesive film and a resultant loss of bond. Naturally, adhesive costs are higher in this case.

Fortunately, experience has taught us that, by proper formulation and by eliminating certain components in the coating color that are undesirable from the adhesive standpoint, functional coatings can be produced that are both grease-resistant and water-resistant and at the same time can be adhered by presently available adhesives. Should it be impossible to completely adjust coating colors to meet the desired adhesive characteristics because of the functional demands placed on the coated board, special adhesives at slightly higher cost may be required.

In addition, since the converter need apply only very lightweight overcoats in his converting operation, pattern coating can often be successfully employed. As a result, many of the adhesion difficulties common to plastic-coated products are eliminated.

To date, we do not know all of the packaging potentials that this board will provide since it has not, as yet, been widely investigated by the majority of converters. However, with the increasing number of coating installations being made on board machines and possible development of satisfactory size press coatings, we envision eventually a number of grades of functional coatings. Naturally, as the availability of this board increases and it is more thoroughly investigated by the packaging industry, its suitability for a greater variety of converting applications will become evident.

We foresee coated grades that will range from the completely grease-resistant, stain-resistant, moisture-vapor-proof type through intermediate grades to the lightly-treated type where the major function will be to assist the converter by providing more suitable surfaces for his converting treatment.



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CURRENT COMMENTS

Leading the comeback . . . duty rates . . . and oddities in the news

by WARREN B. BULLOCK

The paperboard industry is leading the paper industry in a comeback from the lows established in mid-summer. Statements to the effect that the "corner" for the paper industry was turned in August have been followed by recognition of the improving situation by the financial writers of the daily press. Further confirmation comes from James L. Ritchie, executive director of the United States Pulp Producers Association, who was not optimistic over the future 18 months ago. He now says that the present situation is far more encouraging than many of the early pessimists, "including myself", had feared it might be.

Ritchie's optimism was expressed—in a studious review of conditions in the pulp industry—at a meeting of the New York division of the Salesmen's Association of the Paper Industry. He recalled conditions two years ago, when there began to be evidence of alarm at the proportions a new expansion wave was threatening to assume. The excessive flow of capital into the industry for expansion was not curtailed until the general business situation had seriously deteriorated. Figures in late 1956 indicated an aggregate expansion in capacity of more than 12,000,000 tons before 1960—or three years ahead of the historical trend of requirements. Managerial decisions, however, caused suspension or abandonment of much of the contemplated expansion, until the total increase will be slightly more than 7,000,000 tons instead of 12,000,000 tons. Ritchie pointed out that the paper industry is a service industry, and its sales depend on the volume of business established by its customers. He considers recent difficulties as temporary, to be resolved in due course.

A paperboard record

The production of paperboard is soaring, according to Albert W. Luhrs, executive manager of the National Paperboard Association. He cites an output of 308,059 tons in a single week in October, topping the previous high record of 300,900 tons produced in January 1956. The consumers of paperboard allowed their inventories to drop to unprecedentedly low figures during earlier months of the year. Thus, while current utilization of board in production of containers is keeping well up to normal, the box makers are bending every effort to replenish their depleted inventories. In spite of record production, the backlog of orders in the latter part of 1957 was 25,000 tons higher than a year ago.

The total production of paper and paperboard for the first 10 months of 1957 was only 2.5 per cent below the 1956 record. The manner in which paperboard is coming back as compared with paper is seen in the current production reports. Paperboard output is higher by 5 per cent (in the percentage of rated capacity of present operations) than is that of paper.

Meanwhile, financial writers in the daily newspapers are quoting analyses of securities values as indication of an upturn in the industry. One pointed out that paper mill securities out-performed the balance of the market on the up side and have gone downward faster than the average market since the business cycle turned. In the judgment of some of these experts, the paper mill securities have been as low as can normally be expected. In the language of one economist, "many paper stocks are at or near the downside potential, and many are at or close to the 1951 support levels". He finds potentially bullish patterns in Scott and Kimberly-Clark as well as Mead, which has had slight fluctuations. He also favors companies in the specialty container field. Another analyst says that the undervalued securities in the paper industry rank high among potential investments for growth and protection against inflation. One "managed funds" expert figures that many good paper mill stocks can be bought at discounts of up to 40 per cent from their 1956 highs.

Administration plans revealed

Details have been made available by the administration of its plans for further reductions in duty rates. Congress will be asked to pass legislation allowing the President to negotiate duty rate reductions of up to 25 per cent of the existing rates over a five-year period. The battle lines over this legislation are being tightly drawn. There is a stronger sentiment within industry generally for checking the authority of the President to cut duty rates. But, the importing interest and the free trade theorists are massing their forces to demand reductions and elimination of restrictive features of the existing law. Even Russia's success with Sputnik is cited as a reason for reducing duties in order to bolster this country's position with foreign powers through further opportunities for sales in the American market.

More mergers

The acquisition by American Can of Marathon has become effective, and Marathon stockholders are already receiving eight shares of American Can for each ten shares of Marathon held. American Can gets control, through this merger, of all of Marathon's many mills and also of 4500 square miles of timberland on which Marathon holds cutting rights or has actual ownership.

Kimberly-Clark, which already has affiliates or ownership of mills in Mexico, Great Britain and central Canada, has announced the acquisition of 35 per cent of the stock of Irving Pulp & Paper of St. John, N.B.

California give-away

Oddities in the news of the month included some unusual features in paper industry practice. International Paper has given a complete town to the California Veterans of Foreign Wars—a former logging town that came to International with the acquisi-

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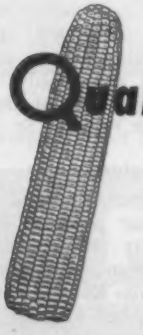

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tion of the huge Long-Bell lumbering properties. The town of Tennant comprises 150 houses, a hotel, school, church, post office, library, power plant and water and sewer systems. The town was founded in 1922 in the forest area north of Mount Shasta, but logging in that region ceased last summer.

Scott Paper has announced its entry into the chemical field with the production for industrial use of Scottfoam, a new urethane product for insulation, cushioning and other uses. The first consumer in quantity will be a converter company in the apparel field.

International Paper has dedicated a new forest experiment station near Bainbridge, Ga., whose chief purpose will be the breeding of new and more valuable species of southern pine. The station comprises 15,000 acres and will include projects for the benefit of wild game, animals and birds alike.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Dec. 10, 1957	Nov. 11, 1957
Celotex	27½	26
Same Pref.	17	16⅛
Certain-Teed	8¾	8⅝
Champion P. & F.	34⅜	34½
Same Pref.	*91-92	*88-88¾
Chesapeake	23½	*23⅜-24
Container	17¾	16⅞
Same Pref.	*84-86	*82-85
Crown Zellerbach	47⅜	43¾
Same Pref.	98¾	86¼
Eastern	*18¾-19⅛	18¼
Federal Paper Board	32⅛	32
Same Pref.	*19⅜-19⅞	*19-19⅛
Fiber Paperboard	21⅛	22¾
Same Pref.	*80½-81	*80½-81
Great Northern	49¼	43½
Hammermill	24¼—	23
International	91⅛	86¼
Same Pref.	92	*85-86¼
Kimberly-Clark	48¼	44
MacAndrews & Forbes	23	25¼
Masonite	25⅛	28
Mead	37⅛	33⅛
Same Pref.	84½	*82-84
Minnesota & Ontario	21⅜	23¼
Oxford	28½	24⅜
Same Pref.	86¼	88
Rayonier	15¾	14⅞
Riegel	21¼	*20¾-21¼
St. Regis	28⅛	27
Same Pref.	*87-89	*86-89
Sealright	23⅜	24⅛
Scott	59¼	53
Same $3.40 Pref.	*73½-77	*71¼-73½
Same $4 Pref.	*90-90¾	*87-88½
Sutherland	33⅛	29¼
Union Bag-Camp	33¾	30
United Board & Carton	*19¾-20⅛	*18¾-19¾
United Wallpaper	6⅛	6¾
Same Pref.	*13-15	*13⅜-15
U. S. Gypsum	60½	65⅝
Same Pref.	162½	*151-156
West Va. P. & P.	34¼	33¼
Same Pref.	97½	82⅝

New York Stock Exchange — Bonds

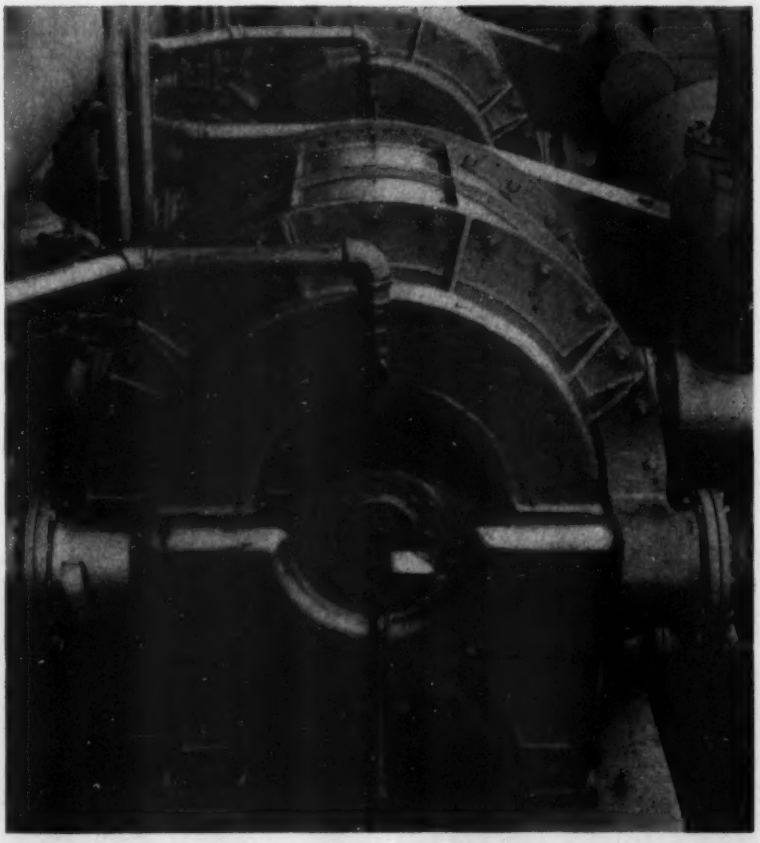
A.P.W. Products 5%	—	76
Champion P & F. 3¾%	—	93½
Champion P & F. 3%	95½	95½
Mead 3%	—	—
Scott 3%	94⅛	91

American Stock Exchange — Stocks

Allied	6⅜	6
American Writing	18¼	19
Brown	10	11
Puget Sound	14	13⅞

*Closing Bid and Asked Prices

High machine speeds? High temperature headbox stock? You need NASH Vacuum Pumps!



Air from the suction rolls on paper machines carries with it substantial quantities of moisture. This considerably reduces the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump, because of the unique principle of operation, the bulk of this vapor is effectively condensed inside the pump. The total capacity of a Nash is therefore increased.

When you specify a Nash Pump it can be closely sized to the job. It is not necessary to select an over-sized unit, because the rated capacity of the Nash may be relied upon.

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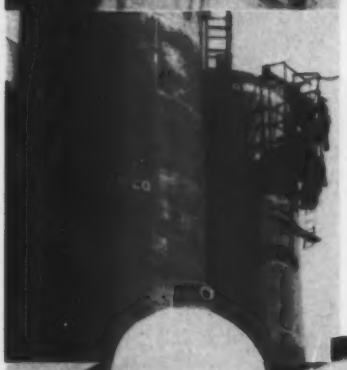


At Weyerhaeuser's new sulphite mill:

CB&I-built Digesters and Accumulators

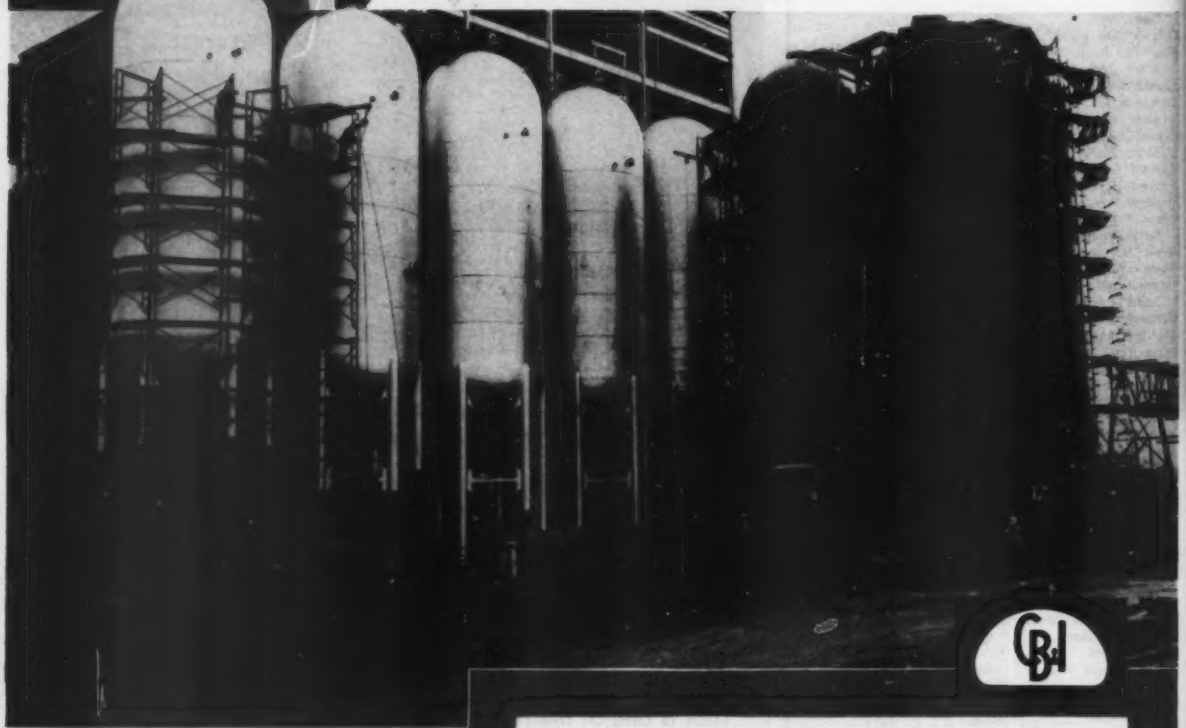
are field erected and stress relieved

CB&I Field Services *went to work* at Weyerhaeuser's new 400-ton sulphite pulp mill—recently completed at Cosmopolis, Washington. The 7 CB&I digesters and 4 accumulators were stress relieved in the field. All welds were similarly checked by specially designed, non-destructive X-ray examination equipment.

By erecting as well as fabricating structures such as those completed at Weyerhaeuser, CB&I is able to offer its customers an exceptionally high degree of quality control between the shop and field. Our field service program offers experience, equipment and on-the-job know-how to handle your most specific requirements. Write our nearest office for the new bulletin on *Field Erection Services.*

Top: CB&I specialist uses portable X-ray machine for examination of seam welds.

Left: Automatic (patented) girth welder being adjusted for welding circumferential joints on accumulator.



Left: 60-foot high digesters are 17 feet in diameter.

Right: Four accumulators have 1,290 cubic foot capacity each.

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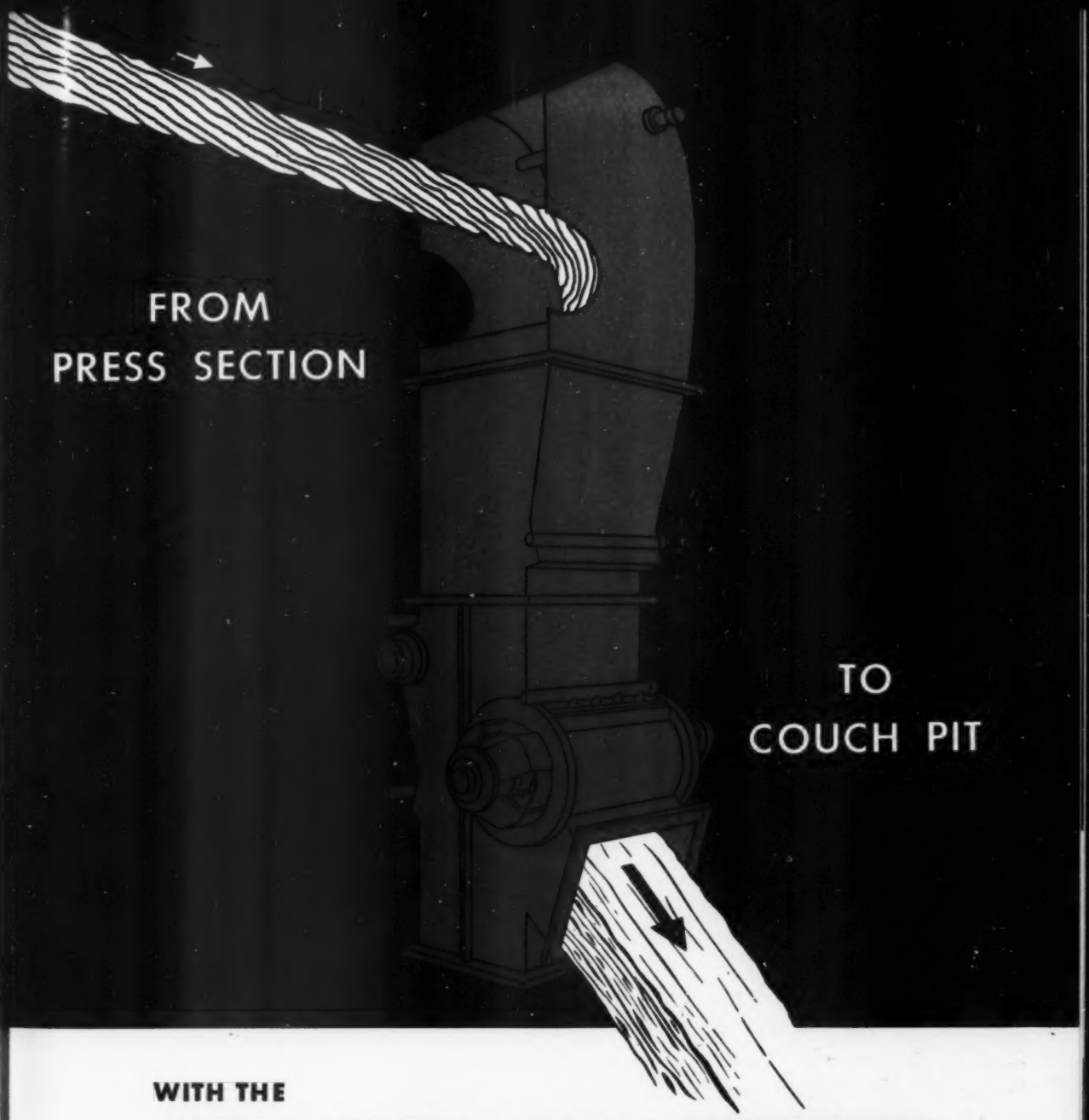

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KEOCOTE			●	
PEARL	●			
KEOGUM	●			

There's an OK Brand product especially formulated for every paper mill operation requiring starches and adhesives ...and there's no extra cost for these top-quality OK BRAND products.

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NEWS of the INDUSTRY

Crossett to Spend $1,000,000 for 1958 Modernization

Crossett Paper Mills, a division of Crossett Co., will spend more than $1,000,000 during 1958 to modernize and expand its paper mill facilities in Crossett, Ark.

Included will be the modification of pulp cooking for bleached foodboard, increased hardwood storage space and additional chemical recovery equipment.

The changes — together with a building program announced a year ago at a cost of $5,000,000 — are expected to be completed this year. The improvements will allow a daily production increase of 20 tons of finished foodboard and in addition make more pulp available for the firm's paper operations.

Owens-Illinois Moves Nat. Container Headquarters

Headquarters of National Container Corp., a subsidiary of Owens-Illinois Glass Co., have been moved from New York, N. Y., to the O-I offices in Toledo, Ohio. Moved to Toledo at the same time were the O-I Mill Div. (from the pulp and paperboard mill at Jacksonville, Fla.) and the Multiwall Bag Div. (from Jaite Ohio).

National Container operates 16 plants for the production of corrugated shipping boxes in 13 states. The Multiwall Bag Div. has a paper mill and bag plant at Jaite, while another plant turns out multiwall bags at Valdosta, Ga.

The Mill Div. consists primarily of pulp and paperboard mills at Jacksonville, Fla.; Valdosta, Ga.; Big Island, Va.; Reading, Pa., and Tomahawk, Wis.; plus timberlands in five states that were controlled by National Container until that firm was merged into Owens-Illinois in 1956.

The general research activities of the Mill Div. have also been established in Toledo at the O-I Technical Center.

Mill Div. executives at Toledo include C. G. McLaren, O-I vice president and general manager of mills and woodlands, and F. B. Schelhorn, manufacturing vice president.

STRAPPING MACHINE recently placed in operation at the Kalamazoo, Mich. mill of KVP Co. The unit has helped to reduce by half the time formerly required for packaging.

Push-Button Strapping Unit Cuts Time at KVP Co.

An integrated packaging line—consisting of roller conveyors and a push-button strapping machine—has reduced by half the time formerly required for packaging procedures at KVP Co. in Kalamazoo, Mich.

Developed in cooperation with Acme Steel Co., the new system—utilizing an Acme semi-automatic strapping machine—permits KVP to channel packed boxes via a conveyor line to a central strapping station.

Prior to the use of steel strapping, food processing papers were packed in telescope cartons and either bound with rope or sealed with tape. The frequent result was loose and/or damaged units.

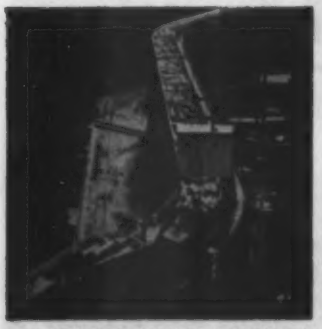
Rope was replaced with steel strapping applied by a combination steel strapper. Although producing a stronger and neater package, this system still required excessive handling.

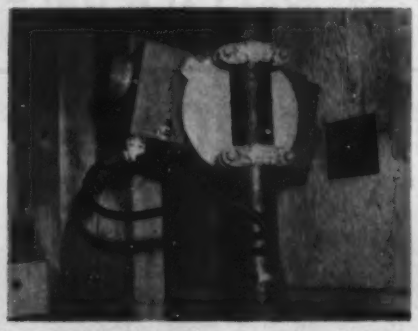
The newest system enables packers to place filled containers on the conveyor line leading to the strapping machine, which unit is operated by one man. After being strapped, containers are moved via the conveyor to the scale, where two men weigh the strapped boxes and stack them on a skid for transfer either to storage or to the shipping platform.

After the paper is cut to customer specifications, it is then packed in corrugated boxes. At the strapping station from two to five lengths of strapping are applied to each box, the size of the box determining the preferred number of straps. (For example, boxes weighing approximately 35 lb. receive two straps at right angles to one another, while units of up to 100 lb. require as many as five straps—three encircling the breadth and two applied to the length.)

Strapped boxes continue along the conveyor to the scale, where they are weighed and stacked on skids and segregated by customer order. Thus the packaging line permits flexibility in production, so that

Television Facilitates Materials Handling at Powell River





MOVEMENT OF GROUNDWOOD blocks at the Powell River, B. C. mill of Powell River Co. Ltd. has been facilitated by the installation of industrial television. Housed in a special shelter (l) mounted above the groundwood block flume, the TV camera (c) is aimed at the precise spot where the 64-in. blocks emerge from the water on spiked rolls (r).

The camera serves as the eye of the groundwood room (l), where the block conveyor operator (r) determines easily whether the blocks are being conveyed at a normal rate. If the blocks are moving too fast, the operator slows their movement on the spiked rolls and/or the chain conveyors by push button. If the blocks are jamming on leaving the water, power to the spike rolls is shut off and the blocks freed by hand. (The all-metal flume is 1200 ft. long.) Television equipment was supplied by Pye Canada Ltd.

mixed sizes and orders can move in an uninterrupted flow through the strapping station.

Nekoosa-Edwards Lets Potsdam Contract

Nekoosa-Edwards Paper Co. has awarded a contract for expansion work at its Potsdam, N. Y. mill. The Port Edwards, Wis. firm reported that the project will include the construction of a bleach plant, an addition to the machine room and the installation of a paper machine.

The bleach plant building (a four-story structure measuring 26 by 68 ft.) will house a single-stage hypochlorite continuous system with a daily capacity of 35 tons. The installation has been designed for eventual expansion to a three-stage 100-ton plant. Included are bleach liquor-making facilities.

The bleach building is to be erected within the existing sulfite mill and is expected to be in operation by spring.

The 23- by 176-ft. addition to the paper machine room will house a production unit being transferred from the Nekoosa, Wis. mill.

Combined with other mill improvements and the installation of filtration facilities for process water, the new construction will cost in excess of $500,000.

Machine Start-Up Marks Project Completion at St. Croix in Woodland

An expansion program costing approximately $14,000,000 has been completed by St. Croix Paper Co. at Woodland, Maine, with the successful start-up of a new high-speed Beloit Iron Works newsprint unit.

The unit has a design speed of 2500 rpm but will operate initially at about 1400. It takes a wire 206 in. in width and produces a trim sheet of 192 in.

The contract for the Beloit machine was signed in October 1955, and the cornerstone was laid on June 12, 1956.

The high machine speeds are made possible by an air-cushion headbox with a vacuum pick-up roll and pick-up felt.

An entirely new groundwood mill provides increased pulp production. Five new Great Northern grinders, each pair driven by a 4000-hp motor, are housed in a new building measuring 60 by 140 ft. Daily groundwood capacity is expected to be 150 tons.

Stock flows to Johnson screens, and rejects are refined for re-entry into the system. Thus the ground-

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MOLD END OF Sandy Hill wet machine recently installed by Spaulding Pulp & Paper at Newberg, Ore. The modernization program has boosted production by about 15 per cent.

Spaulding Completes Pulp-Making Modernization Project

Pulp-making facilities at Spaulding Pulp & Paper Co. in Newberg, Ore., have been completely modernized with the installation of a Kamyr wet machine supplied by Sandy Hill Iron & Brass Works.

The project has enabled Spaulding to boost production efficiency by an estimated 15 per cent. Daily production has been increased from 105 tons in 1949—the beginning of the modernization program—to today's 150 tons.

The Kamyr unit is composed of a vacuum forming element fabricated of stainless steel, two 800 grooved Kamyr presses and a set of pre-dryers between the presses. Following is an Ahlen-Lundberg dryer, a Lamb-Grays Harbor Co. Inc. cutter, a layboy and baling equipment.

The machine is presently operating at a daily rate of 150 air-dry tons of sheeted unbleached sulfite pulp. On a three-shift basis, it has a production capacity of 200 tons per 24 hours.

Featured in the installation is a new type draw control that regulates the speed of various elements in order to maintain a uniform loop between sections of the machine. In addition, the mold has been redesigned from cast iron to stainless steel, providing for greater corrosion resistance and longer life.

---

wood mill is in effect a completely closed system with practically no waste.

Sulfite Mill Modernized

The all-new screen room is completely equipped with primary and secondary screens, deckers, refiners, consistency controls and blending chests.

Increased sulfite production has been provided by the modernization of the present sulfite mill. Acid production has been increased by the installation of two new sulfur melters, a sulfur burner and a 200-ton water chiller.

Digester capacity has been increased from 70 to 120 daily tons by the installation of an improved circulating system and a gas relief system—including a two-unit gas cooler and a 39-ft. recovery tower.

A new power plant provides 125,000 lb. steam per hour at 875 psi. An Allis-Chalmers generator has a 12,500-kw capacity at 13,800v. Coal for firing the boiler is not pulverized but crushed and then burned in a "cyclone".

Sidney Roofing & Paper In Production at Burnaby

Paperboard production is under way at the new $7,000,000 plant of Sidney Roofing & Paper Co. Ltd. in Burnaby, B. C. Operation of the new No. 4 machine marked the first stage in the firm's move from Victoria on Vancouver Island to the British Columbia mainland.

By the early spring of 1959 it is expected that the Victoria plant will be closed down completely after more than 25 years of operation. Economic factors involved in shipping to and from Vancouver Island forced the relocation.

Heart of the new plant is a cylinder machine built for the Burnaby operation by Black-Clawson (Canada) Ltd. Trimming 120 in., the unit has six vats, each equipped with a 42-in. diameter cylinder. The press section includes a suction drum roll, three primary presses and three main presses, the latter having crownless press rolls.

The dryer section contains forty-two 5-ft. diameter dryers in the initial installation. Thirty-six additional units may be installed as required.

Two nine-roll calender stacks follow the dryer section.

Continuous Pulping

The calendered sheet is fed to either a sheet cutter or a drum-type reel capable of reeling paper for 72-in. diameter finished rolls.

The processing of raw materials, which range from waste paper to bleached chemical wood pulps, is carried on in one 18-ft. diameter continuous pulper and two 14-ft. diameter batch pulpers. A broke pulper processes paper machine trim and other machine waste.

The pulped stock is thinned, cleaned and then thickened for storage in four large horizontal concrete chests—one for each of the four stock types.

As the individual stocks are required on the machine they are pumped from the chests to one of three Hydracycle tanks for proportioning and refining as necessary.

Most of the large units of equipment in the stock preparation area were supplied by Alexander Fleck Ltd. Design and construction supervision was provided by Sandwell & Co. Ltd.

St. Regis Paper Co.
at Jacksonville, Fla., has installed its second salt cake recovery precipitator. The action was undertaken to meet the air pollution control requirements of the nearby Municipal Airport, and to recover approximately 37 tons of salt cake daily. The precipitator was supplied by Koppers Co. Inc.

Bergstrom Paper Co.
of Neenah, Wis., has announced

Now—enjoy all the sizing power of Mersize in new low-dusting form

To give you the most for your sizing dollars, Monsanto's exclusive drum-drying process now turns out Mersize RM Dry in a new low-dusting, free-flowing particle. Mill men say they like new Mersize RM Dry because it resists caking, cuts fly loss and causes less irritation than dry powder sizes. You get the full, dependable sizing power Mersize is known for—and more, because virtually every grain goes into your furnish.

New, low-dusting Mersize RM Dry comes packaged in bleached kraft paper so white you can drop bag and all into the beater without fear of discoloring the stock. When you order, it's shipped fast from one of Monsanto's modern plants or strategically located warehouses. These are concrete reasons why 9 out of every 10 mills that have given Mersize a thorough trial have become steady users. If you aren't already using Mersize . . . we suggest you take a look at low-dusting Mersize RM Dry, today.

Mersize—T.M. Monsanto Chemical Co.

Monsanto

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MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
Dept. PC-1, St. Louis 24, Missouri

I want to see new Mersize RM Dry . . . please send a sample.

NAME.....*TITLE*.....

COMPANY.....

ADDRESS.....

CITY.....*ZONE*....*STATE*.....

News of the Industry . . .

that it will close its Whale Safety Paper Co. Div. in Waupaca; expansion plans have of course been abandoned.

Allied News Notes . . .

Black-Clawson Co. has moved its eastern sales office to new and larger quarters in Downingtown, Pa.

The merger of **J. O. Ross Engineering Corp.** and its subsidiaries with **Midland Steel Products Co.** became effective early in December following overwhelming stockholder approval. The resulting firm, **Midland-Ross Corp.**, is headquartered in Cleveland, where the executive offices of Midland have been located since 1924.

Foster Wheeler Corp. has moved its New York, N. Y. office to 666 Fifth Ave.

Ultrasonic sound waves projected through water are now being used by the Tubular Products Div. of **Babcock & Wilcox Co.** to probe for invisible flaws during the manufacture of welded pressure tubing.

Schutte & Koerting Co. has formed a new Instrument Div. to manufacture and market the firm's line of rotameters, flow meters and related products.

Lodding Engineering Corp. has begun construction of a 64,000-sq. ft. plant in Auburn, Mass., a suburb of Worcester. Included will be manufacturing and office areas.

The Solvay Process Div. of **Allied Chemical & Dye Corp.** has announced that Elberta brand anhydrous aluminum chloride is being shipped from the Ransomville, N. Y. plant in specially designed airtight bulk trailers capable of carrying an 18-ton payload. This chemical was formerly available only in hermetically-sealed steel drums.

Fischer & Porter Co. has relocated its Chicago branch in a building especially constructed for its use at 1205 South 8th Ave. in Maywood, Ill.

Monsanto Chemical Co. will build a 100-ton per day urea plant at its Inorganic Div. in El Dorado, Ark.

DeZurik Corp. of Sartell, Minn., was recently host to representatives of Millspaugh Ltd. of Sheffield, England, manufacturer of DeZurik products for British and European markets. The visiting engineers were acquainted with production facilities and techniques.

Wisconsin Wire Works is now fully automated at its plant in Appleton, Wis., through the extensive use of electronic control equipment. According to President James E. Watson, "Automation has improved the quality of fourdrinier wires to a point unobtainable by manual operation and has introduced into the manufacture of this product skills unobtainable through the natural limitations of human control".

Nopco Chemical Co. of Harrison, N. J., is celebrating its 50th anniversary. The firm was the first to make a chemical defoamer intended specifically for paper mill use.

Shell Chemical Corp. will build a new market development unit in Martinez, Cal., for the production of semi-commercial quantities of chemical products, thus facilitating the growth of new chemicals from the laboratory stage to full-scale production.

S & S Associates is a new company recently organized at Norristown, Pa., to act as technical manufacturers representative and consultant for makers of electronic, electromechanical, nuclear and scientific equipment.

Wapakoneta Machine Co. of Wapakoneta, Ohio, has purchased controlling interest in California Grinding Works at Oakland, Cal., a commercial grinder specializing in

Kalamazoo Glazed Tile Tanks

Designed for the Paper Industry

6 Reasons why you should give us a call on your next job

Kalamazoo's steel reinforced glazed tile tanks are designed and erected by experts. If you have a specialized building problem it will pay you early dividends to call us now.

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TILE TANK DIVISION

Kalamazoo TANK & SILO CO. KALAMAZOO MICHIGAN

They packed up turbine oil worries at Alton Box Board

six turbines use NONPAREIL Turbine Oil, have life-of-turbine guarantee

Six NONPAREIL Turbine Oil guarantee certificates on the turbine room wall are pointed out by M. D. Jones, Superintendent of the Power and Steam Department. Standard Oil Company's lubrication engineer, W. P. "Sandy" Wehking, helped put most of the certificates there.

Alton Box Board Company, Alton, Illinois, doesn't have a worry in the world about turbine oil. The Company has six turbines in service—four in the power plant and two in the paper mill—all using NONPAREIL Turbine Oil. Why no worries? Because each of these fills of turbine oil is *guaranteed for the life of the turbine* not to exceed a neutralization number above 0.15 mg. KOH/g.

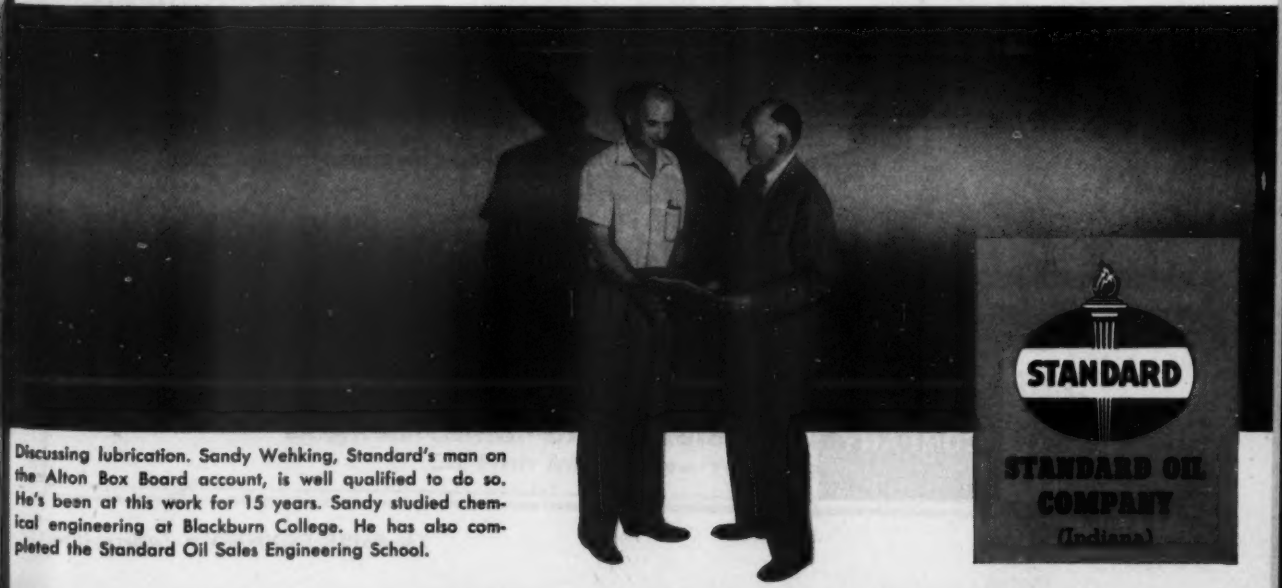
The five Westinghouse and one G-E turbine oil fills have demonstrated a remarkable low acidity record over the years. Regular inspection by Standard Oil technical service representatives and analysis of oil samples by the Standard Oil Research Laboratory, Whiting, Indiana, makes sure the oil is performing in accordance with the guarantee. At Alton Box, neutralization number of the oil has been running 0.02 to 0.03 mg. KOH/g.

This is what such service from a turbine oil means to Alton Box Board: They can run one of the largest board mills in the world without having to concern themselves with the performance of the turbine oil they are using. Standard Oil technical service men inspect the system. The oil is sampled and analyzed regularly. Plant operation will never be interrupted because of turbine oil lubrication failure.

The same performance from NONPAREIL Turbine Oil and service from Standard Oil awaits you. Find out. Call your nearby Standard Oil office near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

How NONPAREIL Turbine Oil is performing at Alton Box Board

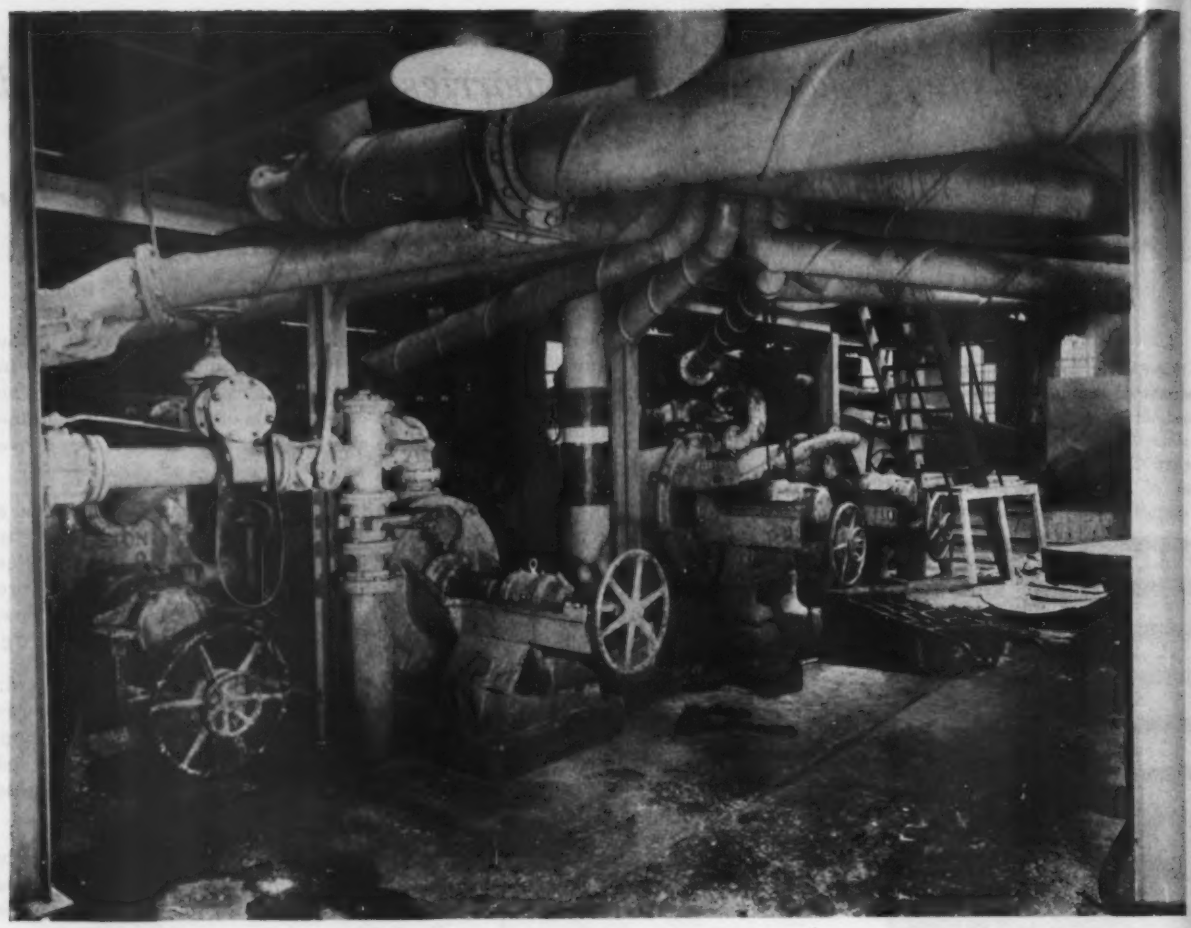
Make of Turbine	kw. (H.P.)	Year NONPAREIL Installed	Location	Gal. fill.	Neut. No. mg. KOH/g.
Westinghouse	1,500	1934	Power Plant	85	.02
Westinghouse	3,125	1936	Power Plant	275	.03
General Elec.	400	1936	Paper Mill	50	.02
Westinghouse	1,500	1941	Power Plant	250	.03
Westinghouse	5,000	1947	Power Plant	230	.03
Westinghouse	1,500	1947	Paper Mill	80	.02



Discussing lubrication. Sandy Wehking, Standard's man on the Alton Box Board account, is well qualified to do so. He's been at this work for 15 years. Sandy studied chemical engineering at Blackburn College. He has also completed the Standard Oil Sales Engineering School.

STANDARD

STANDARD OIL COMPANY (Indiana)



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Whether your piping layout is simple or complicated, NAYLOR Spiralweld pipe can be fabricated to meet your exact specifications in steel, alloys or stainless. Combinations of pipe and fittings can eliminate extra flanges and connections to speed installation and cut costs. For stock pipe lengths, standard fittings, special fabrications or engineered layouts, NAYLOR invites your inquiry. Write for Bulletins No. 507 and No. 525 or send specifications for quotation.

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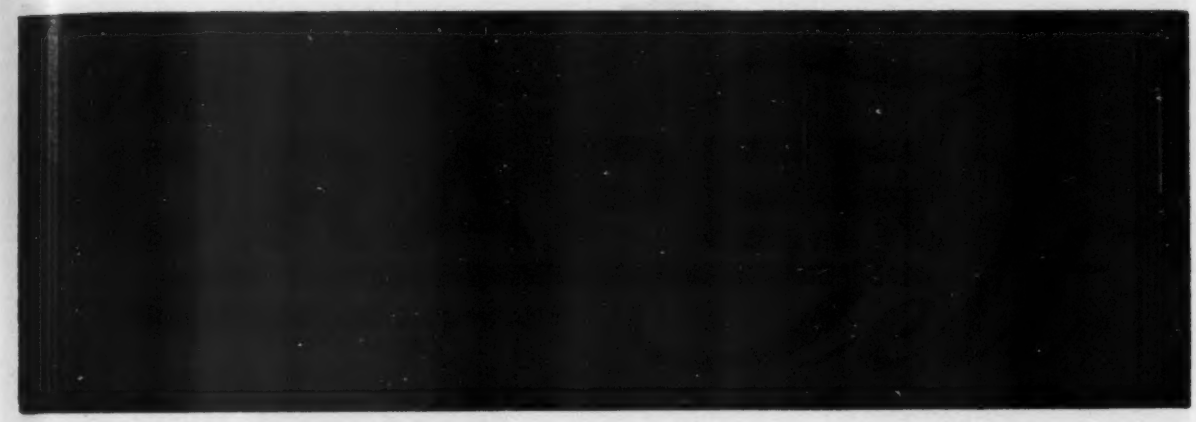

News of the Industry . . .

machine knives, press brake dies and all types of long, flat grinding.

CycloBlower Co. of York, Pa. has been incorporated for the engineering, manufacture and sale of blower-compressors and vacuum pumps. According to C. J. Surdy, president, arrangements for manufacture have been made with George F. Motter's Sons.

Companhia Federal de Fundicao at Rio de Janeiro, Brazil, acquired some months ago by Parsons & Whittemore and Black-Clawson interests, has completed the rebuilding of its foundry facilities. It is now the first South American plant established for the engineering and production of all capital equipment required by the pulp and paper industry.

Habib-General Ltd., a Pakistan company in which General Mills Inc. has a 60-per cent interest, has begun the processing of guar gum at its new plant in Karachi.

Jeffrey Mfg. Co.'s industrial division at Columbus, Ohio, recently held its third factory school for authorized distributors. Twenty-four men from 11 states attended the sessions on crushers and vibrating equipment.

Coming Events

Tappi

January 23—Kalamazoo Valley Section, Hotel Harris, Kalamazoo, Mich. (joint meeting with Michigan Div. Superintendents)

January 23—Chicago Section (St. Louis District), Le Chateau, St. Louis

January 24-25—Southeastern Section, George Washington Hotel, Jacksonville, Fla.

January 30—Delaware Valley Section, Engineers Club, Philadelphia

February 5—Empire State Section (Western District), Prospect House, Niagara Falls, N. Y.

February 7—Empire State Section (Central District), University Club, Syracuse, N. Y.

February 11—Ohio Section, Legion Hall, Middletown, Ohio

February 17-20—43rd Annual Meeting, Hotel Commodore, New York, N. Y.

March 11—Lake States Section, Stevens Point, Wis.

March 11—Empire State Section (Metropolitan District), Fraunces Tavern, New York, N. Y.

March 13—Kalamazoo Valley Section, Hotel Harris, Kalamazoo, Mich.

March 27—Delaware Valley Section, Engineers Club, Philadelphia

Superintendents Association

January 21—Miami Valley Div., Manchester Hotel, Middletown, Ohio

January 23—Michigan Div., Hotel Harris, Kalamazoo, Mich. (joint meeting with Kalamazoo Valley Tappi)

February 13—Michigan Div., Hotel Harris, Kalamazoo, Mich.

March 18—Miami Valley Div., Manchester Hotel, Middletown, Ohio

Other meetings

January 23—Second Annual Pulp & Paper Conference, Western Michigan University, Kalamazoo, Mich.

January 27-30—Plant Maintenance & Engineering Conference and Show, International Amphitheatre, Chicago

January 29-31—CPPA Technical Section (annual meeting), Mount Royal Hotel, Montreal

February 3-4—Instrument Society of America, National Conference on Progress and Trends in Chemical and Petroleum Instrumentation, Wilmington, Del.

February 18-22—American Paper & Pulp Association (annual meeting), Hotel Waldorf-Astoria, New York, N. Y.

March 10-20—11th Annual Short Course in Quality Control by Statistical Methods, College of Engineering, University of Illinois, Champaign

April 9-11—Fifth Annual Conference on Accident Prevention Engineering, University of Florida, Gainesville

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English China Clays Sales Corporation
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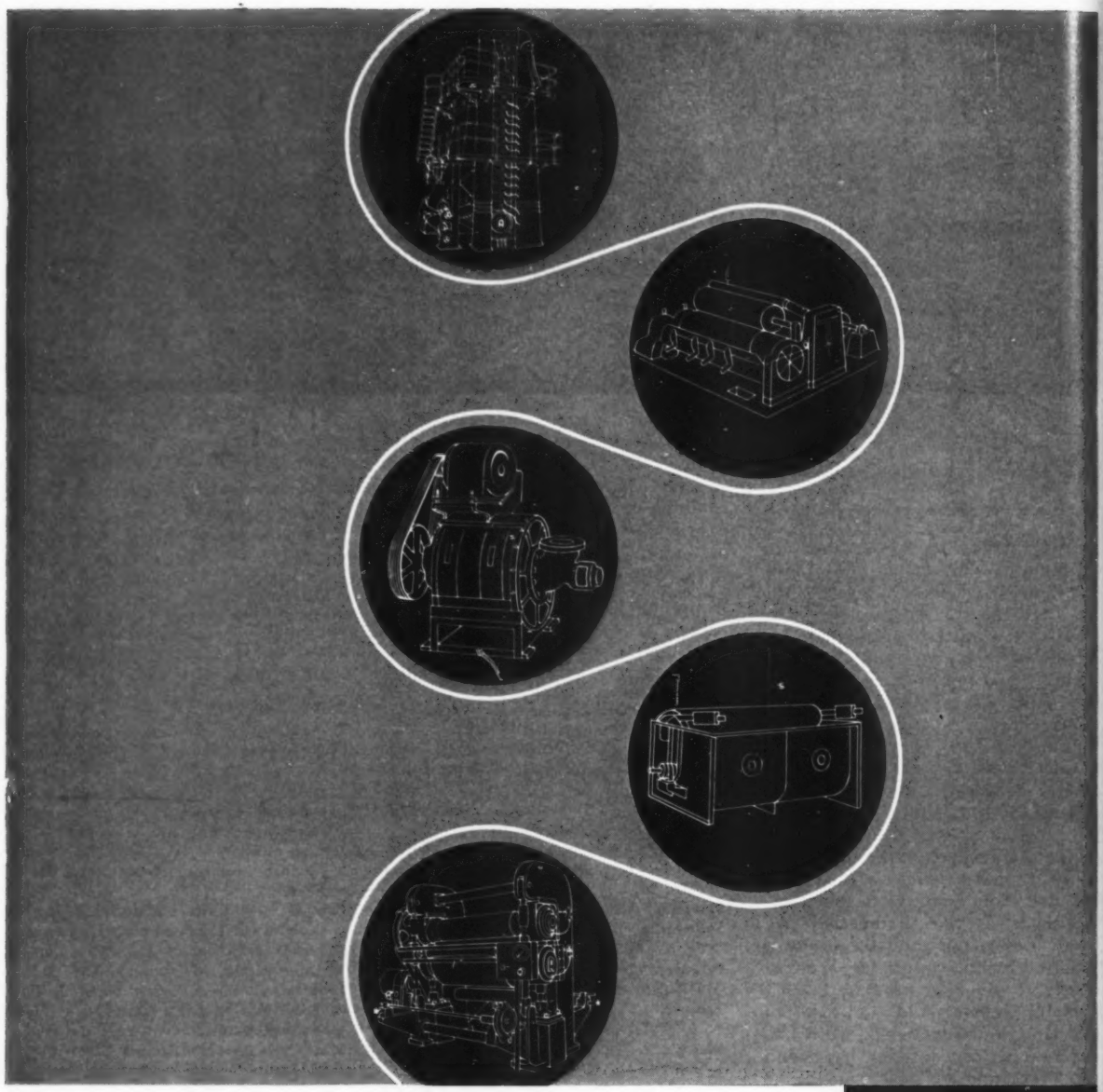

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of the paper industry

APPLETON MACHINE COMPANY

Appleton, Wisconsin

Supercalenders, winders, rotary screens and gravity deckers, textile calenders, machine calenders, calender rolls, Cram Dryer Drainage System.

NAMES in the NEWS

Crandon Appoints McGregor

George H. McGregor has been appointed plant manager of Crandon Paper Mills Inc. of Fort Madison, Iowa.

Formerly general superintendent for Columbia River Paper Mills at Vancouver, Wash., McGregor has had more than 30 years' experience in the paper industry. He has been associated with Minnesota & Ontario Paper Co. and in 1943-1945 was senior chemical engineer for the U.S. Forest Products Laboratory.

G. H. McGregor

R. F. Erickson

Rayonier Elects Erickson

Russell F. Erickson has been elected an executive vice president of Rayonier Inc.

He has been a vice president since 1950 and for the past two years in charge of manufacturing and engineering activities. In 1956 he was named to the board of directors.

Erickson joined Rayonier at Fernandina Beach, Fla., in 1946 as chief engineer of the chemical cellulose plant. He became plant manager in 1948.

Diamond Gardner Announces Changes

Several major organizational changes have been announced by the Gardner Div. of Diamond Gardner Corp. (Diamond Gardner was the resulting corporation in the recent merger of Gardner Board & Carton Co. into Diamond Match Co.)

Richard L. Siegel, assistant to the vice president and general manager of Gardner Board & Carton, has been named vice president and general manager; Bruce W. Martin, vice president for manufacturing, becomes administrative vice president; William Aiken, director of research and development, moves up to director of research developments for the general products group of Diamond Gardner; Delbert C. Meyer, assistant director of engineering, advances to director of engineering.

Colin Gardner, former president of Gardner Board & Carton, is now a vice president of Diamond Gardner and president of the Gardner Div.

Bowaters Staff Promotions

Staff promotions at Bowaters Southern Paper Corp. in Calhoun, Tenn., have resulted in vice presidency appointments for two resident executives.

D. W. Timmis, secretary, has been made first vice president, and V. J. Sutton, mill manager, has been named vice president in charge of operations.

Sir Eric Bowater has relinquished the presidency of the company to become chairman of the board.

P. F. Peterson

F. R. Hamilton

Simpson Promotions

Paul F. Peterson has been named plant manager of Simpson Paper Co. of Everett, Wash., while Frank R. Hamilton becomes director of research and product development. (Simpson Paper is a subsidiary of Simpson Timber Co. of Seattle.)

Peterson is a 20-year veteran with Simpson Paper and its predecessor firm, Everett Pulp & Paper Co. In 1943 he was given responsibility for all personnel and labor relations activities at the Everett mill. In the succeeding years he served as staff assistant to the general manager, staff assistant and comptroller and since August 1957 as administrative director.

Hamilton entered the paper industry with Allied Paper Mills in Kalamazoo, Mich., in 1938. He was Allied plant superintendent in 1951 when he joined Simpson as technical director. He had served most recently as production manager.

Longview Promotes Four

Four supervisory promotions have been announced by Longview Fibre Co. of Longview, Wash.:

Harold C. Wall, since 1952 head of the technical department, has been named technical service specialist; Loyd McDonald, mill effluent supervisor, becomes assistant paper mill superintendent in charge of stock preparation; John W. Klein, assistant paper mill superintendent since 1952, becomes technical director, and Kenneth C. Hackett, chief chemist since 1952, becomes mill effluent supervisor.

G. F. Durand

J. L. Hoolihan

Durand Named President of Port Huron Sulphite

George F. Durand, vice president since 1947, has been named president of Port Huron Sulphite & Paper Co. of Port Huron, Mich. He succeeds the late Norman O. Seagrave.

Durand was at one time associated with Thunder Bay Paper Co. Ltd. at Port Arthur, Ont., and in 1928 joined the staff of Port Huron. He was named secretary in 1929 and vice president in charge of production in 1947.

(Continued on page 890)

PRIVATE EYES

Jenkins' METLKOR brushes, teamed with Viking's Void Detector, check every inch of paper as it is made, find holes, measure them, count them, record them, pinpoint their positions and signal the operator, all automatically. The Jenkins' feeler brush, a critical part of the system, sends a low voltage pulse to the Viking Indicator Unit whenever a hole appears.

John Glump, Vice-President of Viking Instruments, Inc., of East Haddam, Conn., says: "Jenkins' brushes do a superb job for us. They are an improvement on 13 counts:

1. Improve accuracy of flaw detection.
2. Have no abrasive effect on product.
3. Eliminate lint problem.
4. Outlast previous brushes 3 to 1.
5. Made exactly to size, no cutting or alterations necessary.
6. Simplified mounting.
7. Improved construction.
8. Superior bristles.
9. Refillable when bristle is worn.
10. More economical.
11. Free engineering service.
12. Speedy solution to problem.
13. Quick delivery."

Jenkins' METLKOR Paper Polishing Brush

Jenkins' also makes the following brushes for the paper industry:

Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sieve • Static Elimination • Flocking • Felt Cleaning • Feed or Carrier • Paint Brushes • Floor Sweeps

Specify Jenkins' METLKOR
the original . . . the best *Metal Core* brush

METLKOR®
CYLINDER BRUSHES
and LIFEWOOD® WOOD BACKED BRUSHES

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FOREIGN ABSTRACTS

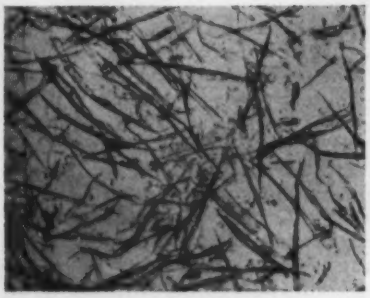

Fig. 1

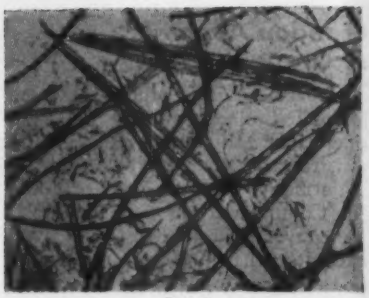

Fig. 2

Chemigroundwood from small sized timber

The chemigroundwood was prepared in the Finnish Central Laboratory on a pilot plant scale. The woods used were birch and Scots pine. Pulps were then shipped to Sweden where they were given trial runs on an experimental paper machine at the Pappersbrukens Centrallaboratorium.

A series of pulp mixtures was prepared using a commercial spruce groundwood pulp and unbleached spruce sulfite, as well as the two chemigroundwood pulps. Newsprint runs were made under varying conditions. Thus, fast runs were made simply through the wet end of the machine, and subsequently slower trial runs were made throughout the entire length of the machine. The purpose of the fast runs was to obtain data on the drainage properties of the mixtures. The slower runs were made so that the properties of the finished newsprint could be tested. Such tests included printability.

A second part of the study dealt with the possibility of using chemigroundwood as a corrugating medium. As a means of comparison, a sample of neutral sulfite semichemical birch pulp with 20 per cent sulfite screenings was run on the machine under similar conditions. The corrugating medium samples as well as corrugated board made from these materials (run on a commercial corrugating machine) were tested for strength and stiffness. Boxes made from the board were also subjected to compression tests. Results may be summarized as follows:

In the case of the newsprint, power consumption in grinding was somewhat lower for the chemigroundwood than for spruce groundwood (made at corresponding freeness values). Chemigroundwood reached a certain strength value at a considerably higher freeness level than did ordinary spruce groundwood. Hence the power output for chemigroundwood was only about 50 per cent of that for spruce groundwood when compared on the same strength basis. The wet strength of the birch chemigroundwood was about the same as for spruce groundwood; that of pine chemigroundwood was higher. Beating increased the wet web strength. The tensile and bursting strengths of birch chemigroundwood were higher than those of spruce groundwood, but the latter showed a higher brightness. Whereas birch chemigroundwood ran well on the experimental paper machine, pine chemigroundwood gave rise to drainage difficulties, probably due to pitch deposits on the wire. Birch chemigroundwood added to the dry strength of newsprint, and the sulfite pulp content of newsprint furnish could thus be lowered without decreasing the strength properties (other than tear). Printability and cleanliness were also satisfactory. With regard to the corrugating medium, birch chemigroundwood proved just as satisfactory as did birch semichemical pulp (which is considered an excellent raw material for corrugated board). The chemigroundwood imparted the necessary stiffness.

On the other hand, pine chemigroundwood was not suited to manufacture of corrugating medium; the fiber was apparently too stiff and too brittle, and thus the corrugating medium could not pass the critical corrugating process without failure. On the other hand, certain laboratory tests showed that pine chemigroundwood might still be used for heavy and stiff boards.

Figs. 1 and 2 show, respectively, birch chemigroundwood (freeness 215) and pine chemigroundwood (freeness 205).

Fifteen references, six figures and 12 tables are included. Waldemar Jensen, Lars Nordman, Georg v. Alfthan and Jaakko Poronen. *Paperi ja Puu* (Finland), 39, 405-416 (1957) (in Finnish with English summary. Tables and diagrams are also in English).

Xylan adsorption on cellulose in the kraft cook

Previously, the present authors showed that black liquor from a sulfate cook when circulated through pure cellulose caused

the retention of xylans by the cellulose and also indicated that a portion of this sorbed material could no longer be extracted with alkali (cf. THE PAPER INDUSTRY 38, No. 4,347 (1956).

This phenomenon has now been studied in simpler systems. Xylan-free cotton linters were heated both in aqueous and in alkaline solutions of xylan isolated from a birch holocellulose. The experiments indicated that in order to insure an extensive sorption of xylan, a relatively high temperature (about 170°C.) and low alkali concentration were required. This would indicate that to effect xylan retention in a kraft cook, most of the initial caustic soda in the liquor must have been consumed. The results suggest that this so-called sorption is actually a crystallization of the xylan [cf. Yundt, *Tappi* 34, 89 (1951)].

The degradation of native xylan by alkali apparently yields fragments that are nearly free from arabinose and uronic acid units. As the alkali concentration decreases, it is accompanied by a decrease in the solubility of these "purified" xylan molecules which tend to crystallize on the surface of the cellulose crystallites. Cotton linters (initially nearly free from xylan), after heating 3 hrs. at 170°C. with a solution of xylan (which originally contained only very small amounts of other sugar units, but contained 8.8-11.9 per cent uronic acid groups) contained appreciable amounts of xylan. Some of these xylan solutions were in water alone, others in various concentrations of sodium hydroxide. As the concentration of alkali decreased, the xylan retention increased. In some instances the xylan content was over 8 per cent. (It was found that commercial kraft pulp or sulfate pulps prepared in the laboratory contained 13.2 to 14.6 per cent xylan).

The hypothesis that xylan crystallization occurs during the kraft cook is supported by the low uronic acid content of such sulfate pulps and also by the marked resistance to hydrolytic attack which characterizes xylan retained by these pulps. For example, experiments with various birch pulps showed that the xylan fraction resistant to heterogeneous hydrolysis with 2.5*N* sulfuric acid for 6 hrs. at 96°C. was about 2.5 times as great in kraft as in sulfite pulps or in the original holocellulose. When holocellulose was subsequently subjected to a kraft cook, the results were very similar to those found with commercial sulfate pulp.

Twenty five references, 5 tables and 2 figures are given. Sven Yllner and Barbro Enstrom, *Svenssk Papperstidn,* 60, 549-554 (1957) (in English).

Pulp from young black locust wood

The wood from 9-10 yr. black locust trees was studied largely from the standpoint of possible kraft pulp manufacture.

The wood was digested both prior to and after hot water extraction (which removed tannins). Black locust wood has a high density (0.745 g/cc.) and has very thick cell walls. The average fiber length is 0.71 mm. The authors expected only limited strength data for the pulp, but the values after beating to 50° Schopper Riegler were much higher than expected. The unbleached kraft pulp showed a breaking length of 8400 to 9200 m., elongation of 5.0-5.6 per cent, tear of 186-206 cmg/cm, burst of 4.0-4.7 kg./ sq. cm. and a folding endurance of 2200-3300 double folds.

These values were not significantly different from pulps from unextracted or extracted wood, but they were considerably higher than those obtained with pulps made from *old* black locust wood. With bleached wood pulp made from *young* black locust wood, the following data were obtained: breaking length, 7720 m., elongation 5.1 per cent, tear 180 cmg./cm, burst 3.9 kg/cm² and folding endurance, 1600 double folds. All of these values are significantly higher than those obtained with commercial bleached chestnut pulps. The unexpectedly high strength properties of young black locust wood pulps are attributed to the great flexibility of the fibers. The very short cellular elements (termed "O-fibers") amounted to 43 per cent by number and 10 per cent by weight. The so-called "pure cellulose" of young locust wood ranged from 41.6 to 43.7 per cent. The average yield of the bleached kraft pulp was about 50 per cent. Since the wood and the bark contained, respectively, only 1.5 and 1.6 per cent tannin, tannin recovery is uneconomical. Judging from limited (unpublished) data, promising results may be expected when young black locust wood is cooked by the neutral sulfite semichemical process.

Georg Jayme and Horst Semmler. 1, *Das Papier,* 11, 396-8 (1957) (in German).

Sodium sulfite pulps

The Skutskär Mills in Sweden, which has long experience in cooking spruce wood with a one-stage sodium sulfite process, has during the past two years based its production on a two-stage process with pine wood as the raw material. The mills have also experimented with some intermediate modifications of the two-stage process, but the latter has shown that pulps can be produced from pine that are comparable in strength and in chemical properties with the best commercial spruce sulfite pulps made by the usual (calcium) sulfite process.

Comprehensive tabulated data show this very clearly, and the bleached pine sulfite pulp prepared by the two-stage cook was actually superior in certain respects. For example, such a bleached pulp retained only 0.07 per cent resin (which brings it into the range of bleached kraft). It could be bleached to about 92 per cent G. E. brightness, and on storage or artificial aging there was practically no reversion. An improved method for the recovery of chemicals used in sodium sulfite pulping is also described briefly. All in all, the sodium sulfite method appears to the further advantage of cutting down pollution of streams or the atmosphere and of sulfur recovery.

Four tables, a flow chart and two graphs are included. Ragnar Söderquist *Das Papier* 11, 487-491 (1957) (in German).

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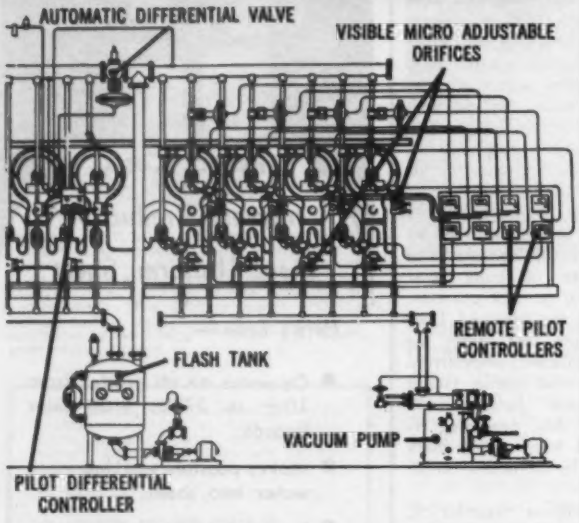

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PATENT REVIEWS

MELVIN NORD*

Multi-stage process bleaching of alkaline-process wood pulps

U.S. 2,805,118, issued Sept. 3, 1957, to Walter P. Lawrence and Arthur C. Salisbury, describes an improved multi-stage process for bleaching alkaline-process wood pulps, employing conventional chlorine bleaching agents and including an "acid sour" between two terminal alkaline hypochlorite states, as shown in Fig. 1.

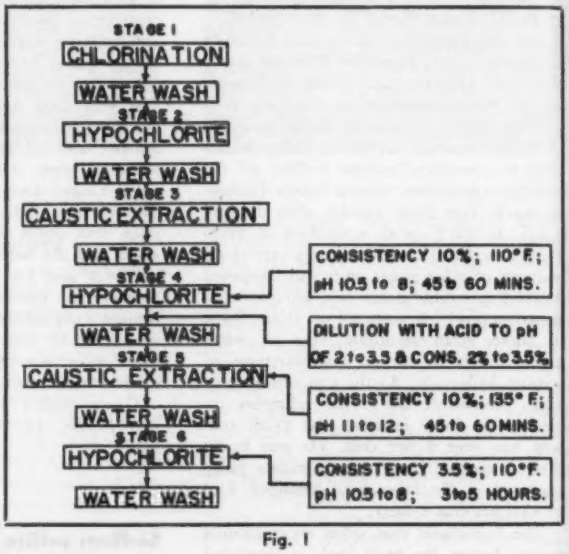


Fig. 1

The result of adding this acid treatment is a gain of 3 to 6 points in brightness without any additional amount of available chlorine being applied and without any material loss in pulp strength.

Manufacture of hardboard

U.S. 2,802,403, issued August 13, 1957, to Robert M. Boehm and assigned to Masonite Corp., describes a process for the manufacture of hardboard, which results in improved appearance and physical properties.

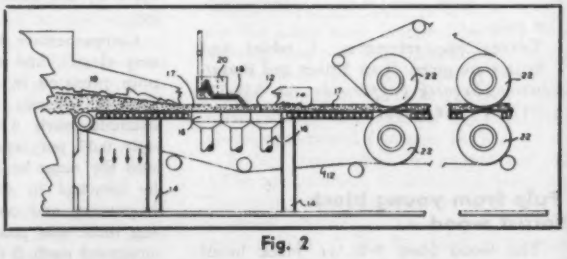


Fig. 2

As shown in Fig. 2, refined fiber slurry is discharged from the headbox 10 onto the travelling screen 12 of a fourdrinier-type machine 14 at a consistency of 1-3 per cent fiber content. The moving sheet of water and fiber passes over an area where a substantial amount of the water flows by gravity through the screen (as shown by the arrows in the figure). The partially formed lap then passes

*Patent attorney, 17600 Pinehurst, Detroit 21.

over one or more suction boxes 16, where sufficient water is removed to increase the consistency of the lap to 22-26 per cent of fiber. The aqueous slurry is maintained, up to the time of its discharge onto the fourdrinier screen 12, at an elevateed temperature, improving the drainage of water from the lap both by the application of suction and by the application of pressure, in that a greater quantity of water may be withdrawn from a wet lap under elevated temperature conditions than may be removed at lower temperatures.

At the point where the consistency of the wet lap 17 has been raised to about 22-26 per cent fiber, i.e. at point 18 of Fig. 2, there is present in the water dissolved solids at a concentration of 1-2 per cent. It has been found that, under these circumstances, sufficient water will adhere to the fibers to cause them to stick to the pressing plates during consolidation of the lap, thus resulting in a finished product having an imperfect surface appearance. Accordingly, at this point, a volume of fresh hot water is flowed on the lap by means of the weir 20. This helps to reheat the cooled wet lap. It also tends to reduce the dissolved solids concentration, and to dissolve other materials which would not be removed at the usual temperatures. The lap thus produced exhibits no tendency whatever to stick during consolidation under heat and pressure. The lap is then travelled between pressing rolls 22, where more water is expressed, the lap thus containing about 50-55 per cent of fiber. The lap is then dried and consolidated under heat and pressure.

Separation of pith and fiber components of bagasse

U.S. 2,805,156, issued Sept. 3, 1957, to John H. Payne, William Kenda and Henry I. Mahon, assigned to Hawaiian Development Co. Ltd., describes a process for preparing a clean fiber suitable for the production of paper pulp and dissolving pulp from bagasse.

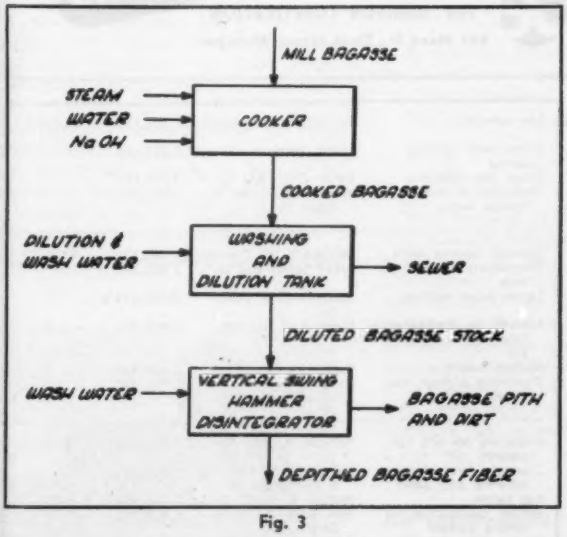


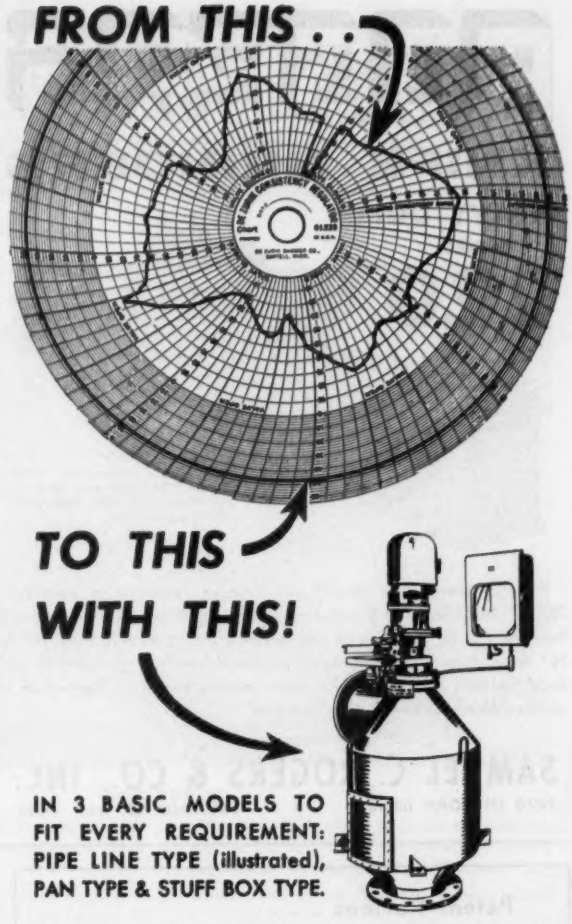
Fig. 3

The process is shown diagrammatically in Fig. 3. The patent describes the swing hammer disintegrator that removes bagasse pith and dirt.

Apparatus for the testing of paper

U.S. 2,806,373, issued Sept. 17, 1957, to Jens C.H.C.J. Bendtsen, describes an apparatus for the continuous testing of paper, e.g. during its production.

The invention is based on the fact that variations of porosity and of moisture can be obtained as simple algebraic functions of thickness and opacity variations. Two detectors are used to determine variations in thickness and opacity from predetermined average values. By means of electrical circuits, the signals from these detectors are combined in the appropriate ways to give direct readings of the porosity, moisture and other properties of the paper.



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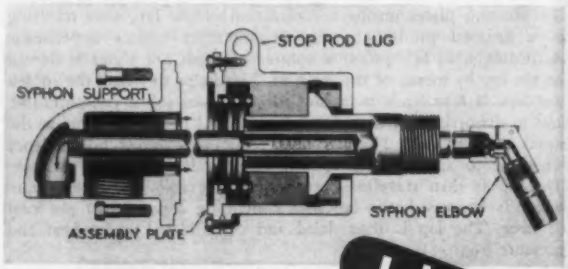

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Patent Reviews . . .

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No	Date
Reinforced container for heavy articles	Crown Zellerbach Corp.	2,801,740	8/6/57
Ventilated container	Robert L. Berner Co.	2,801,742	"
Merchandise package	Naster Corp.	2,801,744	"
Packaging of benzene hexachloride in paper bags	Columbia-Southern Chemical Corp.	2,801,745	"
Counter display carton	Federal Carton Corp.	2,801,754	"
Liquid-tight carton	Charles W. Ingham	2,801,782	"
Display cartons	New Haven Board & Carton Co.	2,801,783	"
Shipping container	Owens-Illinois Glass Co.	2,801,784	"
Container for dispensing flat articles	Continental Can Co. Inc.	2,801,785	"
Paper box handhole reinforcement	William B. Foster	2,801,786	"
Diamond carrier	Curtis C. Wicklund	2,801,787	"
Felt backing material	Congoleum-Nairn Inc.	2,801,937	"
Impregnation of paper with silica sol	E. I. du Pont de Nemours & Co.	2,801,938	"
Production of high molecular weight calcium lignosulfonate	Rayonier Inc.	2,801,994	"
Apparatus for fabricating curved fiber tubing	Brown Co.	2,802,404	8/13/57
Molded pulp filter	Christopher J. Krogel	2,802,405	"
Manufacture of paper containers	Helmut Majer	2,802,407	"
Apparatus for stripping bark	Michigan Coll. of Mining & Technology	2,802,497	"
Wallboard construction method	Marsh Wall Products Inc.	2,802,498	"
Paper dispenser	Ralph Covel	2,802,567	"
Paperboard carrier	Atlanta Paper Co.	2,802,597	"
Liquid carton and seal	American Can Co.	2,802,613	"
Method of assembling cartons	General Foods Corp.	2,802,614	"
Can cartons	Waldorf Paper Products Co.	2,802,615	8/13/57
Carton with carrying handle	Irving Caster et al.	2,802,616	"
Insert bag stiffeners	Bemis Bros. Bag Co.	2,802,617	"
Production of alkali-treated lignin	West Virginia Pulp & Paper Co.	2,802,815	"
Cylinder machine mold	William E. K. Trotman	2,803,172	8/20/57
Manufacture of multi-ply bags	Arkell Safety Bag Co.	2,803,173	"
Carton-lining machine	Ready-To-Bake Foods Inc.	2,803,174-5	"
Machine for feeding paper tubes and crimping an end	Marshall E. Gazette	2,803,176	"
Mailing booklet	Austin L. Elliott	2,803,338	"
Dispensing package for waxed paper	Marathon Corp.	2,803,339	"
Dispensing box and cup support	Kenneth H. Mac Key	2,803,390	8/20/57
Cigarette carton for different size packs	United States Printing & Lithograph Co.	2,803,391	"
Egg carton	Walton D. Lynch	2,803,392	"
Bottom construction for folding cartons	New Haven Board & Carton Co.	2,803,393	"
Carton with reclosable lid	Gardner Board & Carton Co.	2,803,394	"
Carton adapted for opening and reclosing	Lord Baltimore Press Inc.	2,803,395	"
Continuous digestion of wood chips	Condi Engineering Corp.	2,803,540	"
Cohesive wrapping paper	Kimberly-Clark Corp.	2,803,560	"
Treatment of cellulosic materials to impart flame resistance	Dow Chemical Co.	2,803,562	"
Scorebreaker for carton forming machine	Fibreboard Paper Products Corp.	2,804,000	8/27/57
Apparatus for reducing paper rolls to sheets	Union Bag-Camp Paper Corp.	2,804,140	"
Easy-opening can carton	Container Corp. of America	2,804,204	"
Egg carton	Atlas Tack Corp.	2,804,251	"
Chick shipping carton	Patent & Licensing Corp.	2,804,252	"
Composite packing case	Frank G. Brandt	2,804,253	"
Shipping and display containers for bottled products	Frankfort Distilleries Inc.	2,804,254	"
Collapsible carton	Bloomer Bros. Co.	2,804,256	"

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Corrosion-resistant solid film lubricant

A new corrosion-resistant solid film lubricant labeled 66-C is said to be an excellent built-in dry film lubricant for operation in temperatures ranging from 65° F to 600° F, as well as for exceptionally high loads and high speeds. *Electrofilm Inc.*

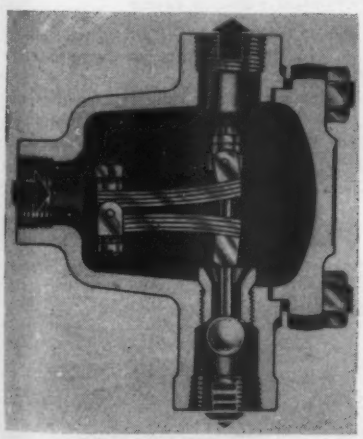
Circle No. 12 on Readers' Service Card

Film-forming acrylic emulsion

A new film-forming acrylic emulsion, Rhoplex C-72, is said to produce hard, tough films which must be dried at elevated temperature to produce a continuous film.

The emulsion can be blended with other acrylic emulsion polymers, such as Rhoplex B-15, AC-33 and B-60A, to reduce the film-forming temperature and/or to increase the hardness of the films from these relatively soft polymers. *Rohm & Haas Co.*

Circle No. 13 on Readers' Service Card



Freeze protector

Here is a schematic drawing of a safety device used to protect condensate lines in cold weather where temporary pressure failure can mean freeze-ups, broken lines and lost production time.

It is installed in the low points of return mains or before risers, and the normal temperature of the condensate keeps the valve closed. In the event of boiler pressure failure or line blockage, the resulting temperature drop will cause the element to open the valve to atmosphere at a predetermined temperature of 90° to 120°F. It is installed in the line as a standard pipe fitting with no additional piping required. *Velan Steam Specialties Inc.*

Circle No. 14 on Readers' Service Card

Air compressor

A new model air compressor, the AR-3, has a free air delivery ranging from 570 to 680 cfpm at 100 psi and is available for either permanent installation or as a skid-mounted unit. *Atlas Copco Eastern Inc.*

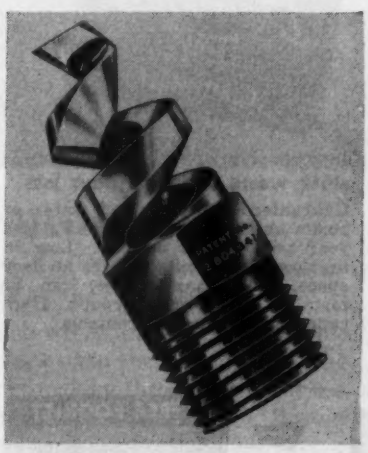
Circle No. 15 on Readers' Service Card

Speed drives

A new line of packaged adjustable speed drives has been announced and is available in ratings of 3 through 150 hp and in speed ranges of 8 to 1 and higher.

These drives are designed for use on continuous processing lines, calender drives, machine tools, paper processing machinery or wherever adjustable speed for fine control is needed. *General Electric Co.*

Circle No. 16 on Readers' Service Card



Pinless spiral nozzle

A patent has just been issued covering three new series of nozzles. The new nozzles have a spiral element that peels the spray from a solid jet into a spiral sheet

Log hauler

A new log hauler designed specifically for travel over rough undeveloped trails has been introduced.

The machine has an electric motor geared directly to each wheel and uses no clutches, mechanical drives or body springs. Payload capacity is 30 tons. *R. G. LeTourneau Inc*

Circle No. 11 on Readers' Service Card

New Products . . .

which breaks up into a fine fog. They are machined from a single solid bar and do not require an internal pin or spreader. *Bete Fog Nozzle Inc.*

Circle No. 17 on Readers' Service Card

Stencil duplicator

This photo shows a hand stencil duplicator called the Web-O-Print.

The duplicator can be used in many operations where quick addressing or marking is necessary. The unit is easy to use. Just type the information needed and slip it on a Web-O-Print. The marking is done by simply stamping the material.

A reservoir inside the Web-O-Print holds enough ink for several thousand prints. The ink leaves a clean, sharp print that will not fade, rub or wash out after drying. Among the many surfaces where it can be used are: cardboard, wood, paper, smooth or rough, round or flat.

The company is offering a fully-illustrated bulletin describing how to use this new-type stencil unit. *Weber Addressing Machine Co. Inc.*

Circle No. 18 on Readers' Service Card

Felt cleaner

A new felt cleaner has been developed that can be used with any acid furnish and with any color.

The company states that this product, called Felteen, is an acid base compound which may be used "on-the-fly" with any acid furnish or with any color. *Clinton Chemical Co.*

Circle No. 19 on Readers' Service Card

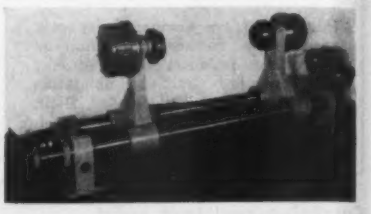
Wear-resistant and self-lubricating material

Devcon WR is a newly-developed material which is said to outwear steel 60 to one and can be cast without heat or pressure.

The material is wear-resistant, self-lubricating and can be used for such applications as: low-speed bearings, building up surfaces subject to severe wear, making duplicating masters and forming dies. It has excellent resistance to most acids, alkalies, solvents and other chemicals and has proved a great value for lining tanks and repairing chemical equipment.

Devcon WR is supplied in paste form and upon addition of a hardening agent, it becomes a syrupy liquid which can be cast or poured into a variety of shapes. *Devcon Corp.*

Circle No. 20 on Readers' Service Card



Shaftless unwind stand

A new heavy-duty, single-position unwind stand for unwinding rolls of paper, board or foil at high speeds has been developed.

This unit (pictured above) is called the Model US. It will handle rolls up to 50 in. in diameter in widths to suit specific requirements. It features electric chucking, sidelay and water-cooled air brakes. *Black-Clawson Co.*

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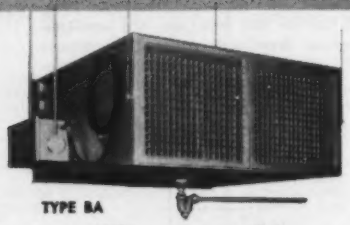
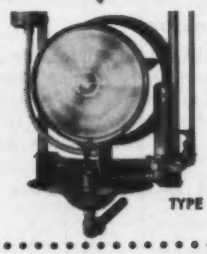




Inexpensive humidification stops stock waste and man hour loss

Guaranteed self-contained water or steam units cost as little as $10 per year per unit to operate. Low in first cost too. Units require no floor space, little maintenance, can be installed singly or in groups. High capacity. Automatic controls.

FREE BOOKLET

Catalog has details, illustrations on complete line. Send for it today. Just clip coupon to letterhead and mail.

NAME PA-1

Bahnson Company

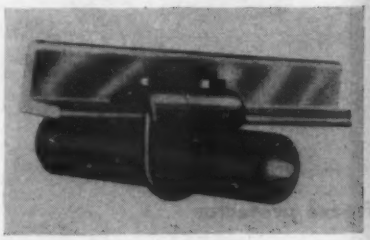
WINSTON-SALEM, N. C.

Portable vehicle scale

Pictured here is a portable vehicle scale which requires no pit and can be re-located as the job requires.

The scales are available in capacities to 70 tons and lengths to 60 ft. Additional scale sections can be joined for greater length and capacity. *Howe Scale Co.*

Circle No. 22 on Readers' Service Card



Right angle conduit hanger

The new Type X right angle conduit pipe hanger presents a new design for sup-

the brighter side of paper-making . . .

. . . is provided by TITANOX* white pigments! Eye-appealing papers start with TITANOX white pigments in which the inherent whiteness, brightness and opacity of TiO_2 are developed to the fullest extent.

But end results are only half the TITANOX story. TITANOX pigments are engineered to arrive "de-problemmed" as it were . . . to eliminate problems in application of the pigment to the stock or to the surface of the sheet. Perhaps our Technical Service Department can help brighten up your paper-making through the best use of titanium dioxide. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1; Vancouver 2.

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

*TITANOX is a registered trademark for the full line of titanium pigments offered by Titanium Pigment Corporation.

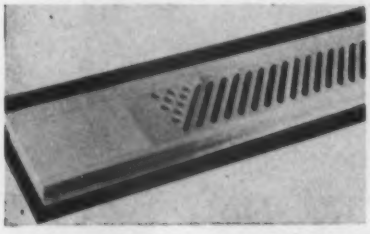
4787

New Products . . .

porting pipe or E.M.T. conduit for mounting on structural flanges up to ⅞ in. thick.

The hanger is made of heavy-gauge steel and case hardened which gives a corrosion resistant surface with a flexible inner core. Sharp biting edges at the corners are further apart than the U-Bolt legs, thereby providing self-equalizing bit pressure and unusual stability. *Ramco Manufacturing Co.*

Circle No. 23 on Readers' Service Card

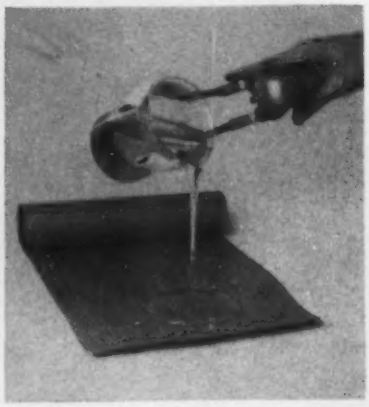


New-type suction box cover

To be known as the UNIFAB, this new suction box cover design features wear-resisting advantages.

The covers are constructed of freshly-cut Vermont rock maple, end-of-grain segments are cut diagonally, slotted and factory-sealed in solid maple frames, while retaining the natural moisture content of the wood. The covers are also provided with a beveled leading edge to serve as a doctor blade or forming board for removing water from the underside of the wire or felt before it reaches the suction area. *John W. Bolton & Sons Inc.*

Circle No. 24 on Readers' Service Card

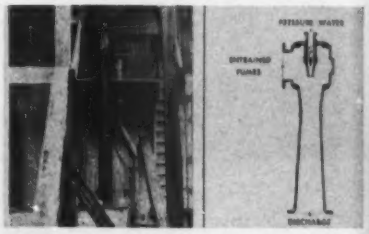


Polyethylene resin

Identified as Epolene C, a new-type polyethylene introduced to the market is said to possess many of the properties generally associated with plastic grade resins and yet can be handled much like a moderate to high melting point wax.

As a hot melt, it can be applied to virtually all types of paper, comparing favorably with coatings achieved by the extrusion of plastic grade polyethylene. As a paper coating material, it can be handled in conventional wax coating machines with only slight modifications, including provisions for higher temperatures in the fountain. *Eastman Chemical Products Inc.*

Circle No. 25 on Readers' Service Card



Fume scrubber for fume and dust control

Pictured here is an SK scrubber that is used to eliminate obnoxious fumes given off by a calciner, which converts ground animal bones to charcoal.

Fig. 1 shows the unit installed, and Fig. 2 shows a sectional drawing of the internal construction of the scrubber.

This scrubber is stocked in a number of sizes and in different types of materials. The company is offering a bulletin fully describing these units. *Schutte & Koerting Co.*

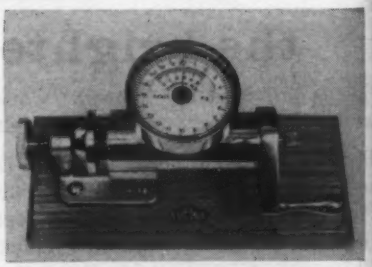
Circle No. 26 on Readers' Service Card

Lacquer coating material

A new lacquer coating material called Saran Resin F220 has been introduced and is particularly recommended for coating paper as well as polyethylene, cellophane and polyester films.

F220 gives polyethylene film greater clarity, improved gloss and slip and gives improved chemical resistance to a wide variety of packaging materials. *Dow Chemical Co.*

Circle No. 27 on Readers' Service Card



Bursting strength tester

This hand-operated bursting strength tester is said to determine strength properties within a short time.

In this instrument a circular paper sam-

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for the paper industry

- WOOD TANKS — for stock, pulp and acid storage
- WOOD PIPE — continuous stave or sectional
- VOMIT STACKS — unlimited diameters and heights
- BLOW PITS — round or elliptical
- RIFFLERS — to your specifications
- ELEVATED TANKS & TOWERS, SCRUBBERS AND DEGASIFIERS — forced or natural draft
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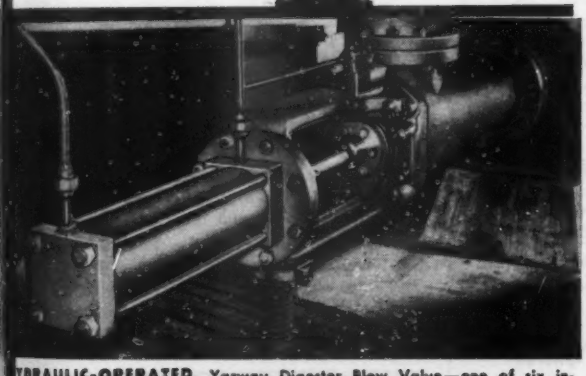


YDRAULIC-OPERATED Yarway Digester Blow Valve—one of six in-alled at large North Carolina paper mill.

OTOR-OPERATED Yarway Digester Blow Valve—one of eight installed large Canadian paper mill.

Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show greater discharge area—reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.

YARNALL-WARING COMPANY

149 Mermaid Avenue, Philadelphia 19, Pa.

BRANCH OFFICES IN PRINCIPAL CITIES

·· DIGESTER BLOW VALVES

New Products . . .

ple is ruptured by pressure, and the requisite pressure as well as the maximum convexity height are indicated on a large scale. The force is generated by a spring which is pressed on a die causing rupture of the clamped paper. The outer scale of the dial indicates the bursting strength in kg, and reading of the convexity height in mm is done on the inner scale. *Karl Frank GMBH*

Circle No. 28 on Readers' Service Card

Sky blue dye

Pyrazol Fast Sky Blue 7GUL is the name given to a new dye which is now available. This will be of particular interest to manufacturers of cover, bond, specialty, bag and similar grades of paper where light fastness is important.

A bright greenish blue in shade, this dye is said to be among the greenest of the direct blues and shows only a very slight break in Fade-Ometer exposures of 20 hrs. or more.

Sample dyeings on this new product, along with other technical service, is available from *Sandoz Inc.*

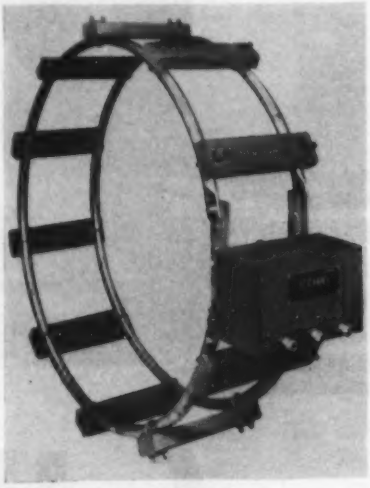
Circle No. 29 on Readers' Service Card

Pipe jacket

An announcement has been made of an improved method of cooling or heating through a new type pipe jacket.

Solid rubber cord of a heat-resistant compound is wound to the selected pitch around the pipe to be cooled. Two sections of the jacket are easily bolted on. A bulletin is offered by the company showing proper selection of pitch. *F. R. Gross Co. Inc.*

Circle No. 30 on Readers' Service Card

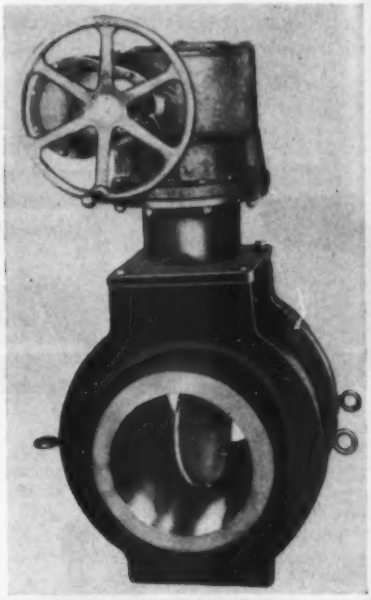


Electronic metal detector

This metal detector can be installed on any conveyor system handling non-magnetic materials. The highly-sensitive inspection loops will detect tiny metal particles at speeds from 30 to 600 fpm. Control circuits can be set to trigger a warning light or other signal, or to actuate a reject mechanism that will divert contaminated products.

Special sizes and shapes can be designed for any installation requirements. Further information on this unit can be obtained from *Stearns Magnetic Products.*

Circle No. 31 on Readers' Service Card



Alloy steel R-S butterfly valve

Here is a new 14-in. alloy steel R-S butterfly valve which is particularly adaptable for regulating service in the process industries.

An outstanding feature of this model is the unusually high-pressure service not formerly associated with this type of valve. It is designed for service at 2630 psig with working pressures at 450° F and is equipped with welding ends and manual control. *S. Morgan Smith Co.*

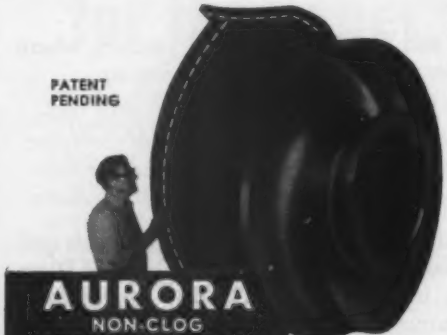
Circle No. 32 on Readers' Service Card

Colorimetric titration kit

The versatility of two electronic colorimeters has been multiplied by an easy-to-install accessory that enables the chemist

(Continued on page 888)

No SEPARATE COUNTERBALANCE is REQUIRED



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NEW LITERATURE

Books

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS. By N. Irving Sax. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 1467 pages. The price is $19.50 until the end of December and $22.50 beginning in January.

N. Irving Sax has designed this book with the purpose to extend the scope of and improve upon the usefulness of his previous work in this field entitled, "Handbook of Dangerous Materials". The fixed objective was to afford readers a more detailed picture of the hazards which accompany the use of the materials of industry, and also to supply authentic textual material by means of which the reader can quickly gain insight to whether a given compound or material is potentially dangerous and what precautionary measures should be taken.

FOREST FERTILIZATION. Compiled by Donald P. White and Albert L. Leaf. Address requests to: Dr. E. D. Crittenden, Director of Research, Nitrogen Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 300 pages. $3.00.

This book has been published by the State University College of Forestry at Syracuse University. Dr. Hardy L. Shirley, dean of the College of Forestry, has pointed out that this book is the result of two years' work and has been published to aid the many new investigators on forest soils research, as well as practicing foresters and forest land owners the world over. He also stated that forestry educators and researchers will find references to the world's literature on forest fertilization experiments. They will also find this work to be a very useful reference book.

The book contains 700 references with abstracts on the use of fertilizers on trees throughout the world. It covers the period from 1865 through 1956.

MATERIALS HANDLING EQUIPMENT. By D. Oliphant Haynes. Published by Chilton Co. Inc., 56th & Chestnut Sts., Philadelphia 39, Pa. 636 pages. $17.50.

This book is a fine graphic presentation of materials handling equipment designed to show specifically how each machine functions and what it actually does. The author, a well-known consulting industrial engineer, has compiled this volume in a manner in which the reader can actually see what makes the wheels go around and why.

Over 2200 line drawings were made especially for this one volume to illustrate the basic internal parts and the internal "why" of the materials handling machines. The author has gone on to explain the new up-to-the-minute methods and the basic tried-and-proved systems.

The contents of this book can be of great importance to management, who must be informed as to what is needed in machinery and what methods can be best suited for particular needs.

Booklets and Pamphlets

PRINCIPLES OF MICRORADIOGRAPHY. Prepared by Eastman Kodak Research Laboratories and published by Philips Electronic Inc.

One section of this 48-page booklet is devoted to the principles of microradiography and discusses contact and projection techniques together with x-ray microscopy. A few of the other subjects covered include: definition, geometrical blurring, film unsharpness and photomicrographs.

You may receive a copy of this booklet without obligation by writing to Instruments Division, Philips Electronics Inc., 750 South Fulton Ave., Mount Vernon, N. Y.

DYEING PAPER WHITE. Prepared by the Dyes Department of American Cyanamid Co., this booklet is a detailed story of the use of Calcofluor White PMS, CONC. in dyeing paper.

This booklet is in two parts. Part I deals in general principles, and part II deals with technical descriptions of application.

A copy is available from American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.

USDA Reports

A RECORD OF THE TIMBER CUT FROM FORESTS OF THE LAKE STATES. This is the seventh in a series of reports published by the station on timber cut from forests of the Lake States. The purpose of the contents is to furnish information to industries and public agencies on the quantity of forest products harvested; the origin of individual products by species and class of material, and the volume of timber removed through cutting from the forests of each of the three Lake States during a specific year. The data are for timber cut in logging only. A copy of this report is available from Lake States Forest Experiment Station, St. Paul 1, Minn. Ask for Station Paper No. 53 dated September, 1957.

LIST OF PUBLICATIONS. A booklet has been published by the Forest Products Laboratory listing the publications issued from January 1 to June 30, 1957. The title and a brief description of each subject is listed. For a copy of this booklet write to Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison 5, Wis.

SILVICAL CHARACTERISTICS OF SLASH PINE. Slash pine is one of the most important in the southeastern United States. This report covers the silvical characteristics of the typical slash pine. Such subjects as habitat conditions, life history, races and hybrids are featured, as well as a section on cited literature. For copies of this report, write to Southeastern Forest Experiment Station, Asheville, North Carolina.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Laboratory flat screen

Sprout, Waldron & Co. Inc. has just announced the availability of a bulletin which gives the complete description and specifications of its laboratory flat screen. It offers a means of accurately determining much of the necessary information needed in pulping.

Circle No. 39 on Readers' Service Card

Felt cleaners

Clinton Chemical Co. has published a bulletin describing the company's felt cleaners for paper mill use. The bulletin describes the "on-the-fly" method for applying the cleaners.

Circle No. 40 on Readers' Service Card

Turbine-generator units

General Electric Co. is offering a bulletin containing information and data on condensing turbines utilizing either non-reheat or reheat; noncondensing turbines; single, double and triple automatic extraction turbines; admission units, and admission-extraction steam turbines.

Circle No. 41 on Readers' Service Card

Interfloor conveying systems

Gifford-Wood Co. is issuing a new 4-page bulletin on the latest developments in automatic interfloor conveying systems for unitized loads. Covering pallets, bales, drums, paper rolls, cartons and other packaged units, the bulletin describes the versatility, speed, safety and smooth transfer features of modern automatic conveying systems.

Circle No. 42 on Readers' Service Card

Heat seal characteristics of polyethylene film

U.S. Industrial Chemicals Co. has published a report entitled, "Heat Seal Characteristics of Polyethylene Film." The report is illustrated with 40 graphs to provide a useful tool for converters and represents the results of a series of

tests conducted at the laboratories of USI subsidiary, National Petro-Chemicals Corp., where the Petrothene polyethylene resins are made.

Circle No. 43 on Readers' Service Card

Gate valves

Lunkenheimer Co. gives details and illustrations on the company's new edition of the King-Clip gate valves in a 4-page bulletin just published. Tables of S.P. and W.O.G. pressure ratings are given in the bulletin along with the dimensions, parts identification and descriptions of these valves.

Circle No. 44 on Readers' Service Card

Single rotating disc pulp refiner

Sprout, Waldron & Co. Inc. has announced a new booklet describing the single rotating disc pulp refiner. The booklet describes both standard and acid-resistant types, gives complete design and dimensional data as well as performance characteristics and resume of applications.

Circle No. 45 on Readers' Service Card

Acid cleaner

Key Chemicals Inc. is offering literature on the company's new product called Key-Mix 28. This product is a cleaner used to clean fourdrinier wires, cylinder molds, papermaker felts and to descale black liquor evaporators. Complete data, prices and instructions are furnished.

Circle No. 46 on Readers' Service Card

Chart used for choosing the right optical brightener

CIBA Co. Inc. is distributing a dialing chart for use as an aid to the most effective selection of the company's UVITEX brighteners. The chart is carefully organized to show a maximum amount of data in a minimum amount of space as it indicates properties and compatibilities of the UVITEX for application on nine natural and synthetic fibers plus fiber blends and paper.

Circle No. 47 on Readers' Service Card

Paper and foil scales

Amthor Testing Instrument Co., makers of direct reading paper reduction scales, is offering data sheets explaining and illustrating the company's line of scales.

Circle No. 48 on Readers' Service Card

Lighting for critical color matching

Macbeth Daylighting Corp., in a handy reference booklet, gives information on efficient color matching lighting. There are charts and other technical data showing how problems are solved by using the Macbeth Daylighting.

Circle No. 49 on Readers' Service Card

Magnetic liquid level gage

Jerguson Gage & Valve Co. has a 2-page data sheet which illustrates and describes the operation and gives technical data on the new magnetic gage which makes safe the accurate gaging of explosive or inflammable liquids.

Circle No. 50 on Readers' Service Card

Polyvinylpyrrolidone

General Aniline & Film Corp. A detailed 48-page booklet is abailable on the versatile, high-molecular weight polymer PVP (polyvinylpyrrolidone). Its chemical and physical properties and the numerous applications so far developed have also been described.

Circle No. 51 on Readers' Service Card

Chemi-drain channel pipe

Logan Clay Products Co. Chemi-drain channel pipe is the chemically-enert vitrified clay product designed for handling and disposal of highly-corrosive fluid industrial wastes. The company is offering a 4-page circular illustrating and describing installation features and specifications of the pipe.

Circle No. 52 on Readers' Service Card

Wall chart of conversion factors

Precision Equipment Co. is distributing a new edition of the company's wall chart of conversion factors. Included are common conversions such as inches to centimeters, watts to horse power, cubic feet to liters and many other conversions such as microns to meters and quintal to lbs. The company is offering this chart free of charge.

Circle No. 53 on Readers' Service Card

Drives

Eaton Mfg. Co., manufacturer of adjustable speed Eddy-Current drives, has two descriptive sheets and a bulletin which illustrate and describe the basic dynamatic Eddy-Current units. This information shows the many applications which the units have in the paper industry.

Circle No. 54 on Readers' Service Card

V-belt drive

Dodge Mfg. Corp. now introduces a separate V-belt drive manual containing all V-drive information previously available in the company's full line. Tables have been expanded to include more pre-engineered drives. The annual is a 108-page book which is packed with information on selection and operation of drives. It is an asset to plant engineers and others who deal with transmission problems.

Circle No. 55 on Readers' Service Card

Future potential for titanium tubing

Babcock & Wilcox Co. has made a reprint of an article entitled, "Present Status and Future Potential for Titanium Tubing." The 8-page article describes the involved method of producing titanium tubing and outlines briefly its many characteristics. It also explains why titanium tubing is uniquely immune to many corrosive conditions which have long been the number-one problem of process engineers.

Circle No. 56 on Readers' Service Card

Solid and open steel flooring

Joseph T. Ryerson & Son Inc. describes applications of five different types of steel for floors, stairs, steps, ramps, catwalks and platforms. Construction advantages and methods are also given.

Circle No. 57 on Readers' Service Card

Vinyl acetate monomer

Union Carbide Chemicals Co. A new 16-page booklet on Niacet vinyl acetate monomer has just been released by the company. The booklet is sectioned showing operating procedures, physical properties, specifications, shipping data, applications, polymerization techniques, analytical procedures and physiological properties.

Circle No. 58 on Readers' Service Card

Film on automation

Wisconsin Wire Works has published a film entitled "These Few Seconds". This film is a brief interpretation concerning why and how Wisconsin Wire Works has become automated. The company also stated that automation has improved the quality of the product to a point unobtainable by manual operation.

Circle No. 59 on Readers' Service Card

Price data on seamless, stainless pipe

Babcock & Wilcox Co. has published a data card furnishing the analysis details and comparative price ratios of 31 seamless stainless grades of pipe and tubing.

Circle No. 60 on Readers' Service Card

Stainless steel fasteners

Allmetal Screw Products Co. Inc. has prepared an 8-page condensed guide to stainless steel fasteners normally carried in stock by the company. There are 37 different types of fasteners illustrated.

Circle No. 61 on Readers' Service Card

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1958

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SUCTION BOX COVER

offers these features:

1. Even distribution of fabric assures EVEN WEARING.
2. Ends of threads contact wire, assuring uniform surface to wire.
3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
7. Reslin can supply a greater open area without sacrificing strength.
8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

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NEW ENGLAND & NORTH ATLANTIC REPRESENTATIVE
George Clayton
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Norristown, Pa.

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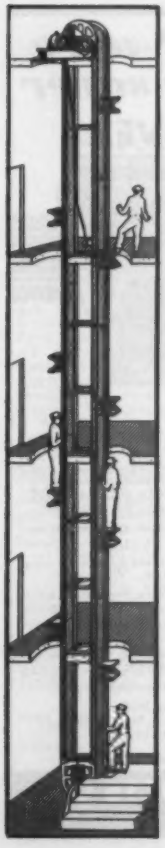

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Inc.

344 1st Ave. N.W.

Faribault, Minnesota

Humphrey is the original Manlift Elevator, made continuously since 1887.

New Products . . .

(Continued from page 884)

to perform titrations using colorimetric endpoints.

The new kit consists of a magnetic stirrer for sample mixing and a hinged lid assembly for introducing a standard or micro buret into the cell compartment. By the proper choice of the electrophotometer filters, the operator can measure the absorbance of the sample during titration. A sudden change in absorbence indicates the endpoint; the exact endpoint is obtained graphically from the intersection of two straight lines on a plot of ml titrant vs absorbence. *Fisher Scientific Co.*

Circle No. 33 on Readers' Service Card

Ion-exchange resins

Two new ion-exchange resins for chromatography have been developed with specific utility in chromatographic separation and identification, especially of the components of complex amino acid mixtures.

One of the resins, known as Amberlite CG-120 (400-600 mesh) is a strongly acidic cation-exchange in sodium form. Amberlite CG-50, (400-600 mesh) is the other resin, which is a weakly acidic cation-exchange resin in hydrogen form. *Fisher Scientific Co.*

Circle No. 34 on Readers' Service Card

Two-roll and five-roll calenders for paper laboratories

Two-roll and five-roll calenders for paper laboratories are now in production and are presently available for straight pressure work only.

The calenders are of unit construction in that each calender with its individual drive is mounted on a steel mounting base. The roll loading push-button-type control valve, the individual pressure regulators with gages and the motor drive push button control station are all flush panel mounted in the base on the operator's side of the machine. They are shipped fully assembled, piped and wired, allowing immediate operation as soon as the electrical and air connections are made to the laboratory supply. *Birch Brothers Inc.*

Circle No. 35 on Readers' Service Card

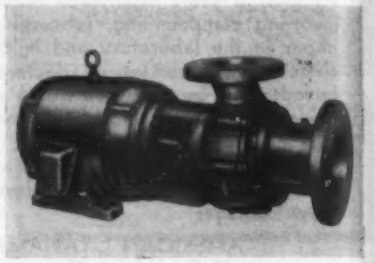
Felt conditioner

Bird Machine Co. has released its latest streamlined-model Vickery felt conditioner, which is equipped with remote control for ready adjustment to paper machine speed.

The machine's new hydraulic drive permits operation by a control panel. The new design keeps the entire unit neatly housed so no outside hoses or header projects beyond the paper machine frame.

In operation, warm water goes through the felt and back in several hairpin turns as the felt travels along the shoe. More water can be sprayed into the felt and higher vacuum employed without wrinkling the felt even at the highest speeds. The vacuum boxes (number depending on the width of felt) are adjustable for trim of the felt as well as vertically. *Bird Machine Co.*

Circle No. 36 on Readers' Service Card

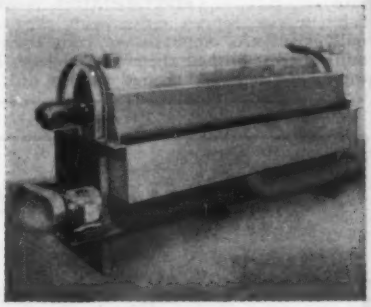


End suction general purpose pumps

These pumps may be ordered in close-coupled horizontal, flange-mounted vertical, base-mounted vertical and pedestal-mounted horizontal units. Sizes range: ¼ hp to 40 hp at 3500 rpm and ¼ hp to 20 hp at 1750 rpm.

Applications such as circulating, coolant, cooling towers, condensate return, booster, hot water, tank-mounted, filters, sprinklers and many others can found in using these units. *New York Air Brake Co.*

Circle No. 37 on Readers' Service Card



Pressure extractor

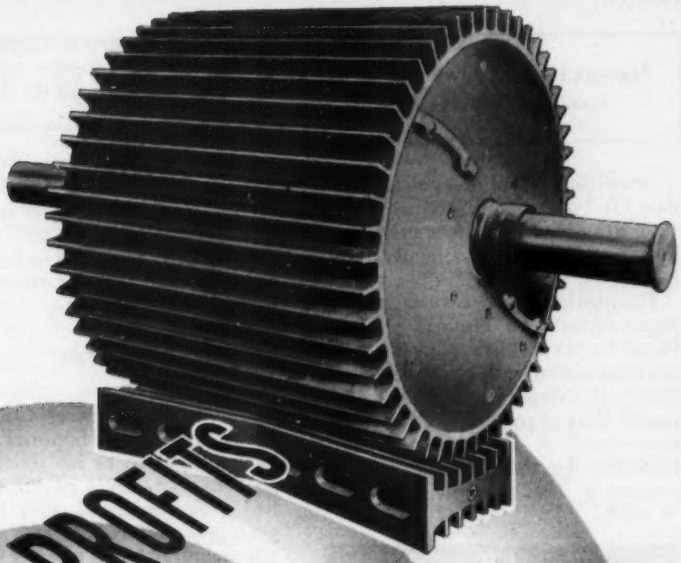
A new and effective way to take out tacky and tar-like dirt on stock can be accomplished by a new pressure extractor.

The stock is fed between the nip of the two rolls, a rubber-covered bottom roll and a wire-covered, pre-loaded top roll. Tacky materials such as rubbery compounds and asphalt are neatly picked up by the wire surface. They cannot adhere to the bottom roll. A high-pressure shower inside the wire roll transfers the rejected material to a trough.

The company has stated that this pressure extractor is designed to do the dirt removal job far more completely and efficiently than a dandy roll. A unit employs a 1½-hp drive and handles from 7-13 tons of stock per day.

The company welcomes your request for further technical information on this unit. *Bird Machine Co.*

Circle No. 38 on Readers' Service Card



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DIVISION OF HARSCO CORPORATION

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HIGH BRIDGE 5, NEW JERSEY

Cincinnati, O. — Birmingham, Ala. — Easton, Pa.

Names in the News . .

(Continued from page 873)

Succeeding Durand as vice president in charge of production is Joseph L. Hoolihan, formerly plant manager. He was also named a director.

Hoolihan began his pulp and paper career with Thilmany Pulp & Paper Co. in Kaukauna, Wis., being later associated with Kimberly-Clark Corp. at Niagara Falls, N.Y. He joined Port Huron in 1924 as night superintendent at the sulfite plant. Hoolihan became general superintendent in 1942 and plant manager in 1955.

L. C. Crowder

J. H. McCarthy

St. Regis Advances Three

Lawrence C. Crowder has been named chief engineer in the pulp and paper division of St. Regis Paper Co. He succeeds Justin H. McCarthy, who has been vice president and chief engineer and now becomes vice president in charge of engineering for pulp and paper.

Crowder was formerly project engineer and as such had charge of the construction of the recently completed 1000-ton kraft paperboard machine at Jacksonville, Fla.

In another St. Regis appointment, Dr. Robert W. Reed was named to the newly created post of staff planning engineer. His initial concentration will be in the development of a planned program for the most advantageous utilization of the forest resources and facilities recently acquired in the Northwest.

He was formerly with Rhinelander (Wis.) Paper Co., a St. Regis subsidiary. He joined the firm in 1948 as research director, was later technical director and at the time of his transfer was sales manager for converted papers.

Frohman Retires

Sidney Frohman, chairman of Hinde & Dauch Paper Co. of Sandusky, Ohio, was honored recently on the occasion of his retirement as an active employee of the firm. He had been associated with H&D 47 years and was retired as a result of the technical merger of his company as a major operating division of West Virginia Pulp & Paper Co. The merger became effective September 30.

He will continue to serve on the board of directors of West Virginia Pulp & Paper.

Frohman joined H&D in 1910 as treasurer and succeeded to the presidency in 1918 on the death of J. J. Dauch, one of the founders. He became board chairman in 1951 and was succeeded in the presidency by his nephew, Charles E. Frohman.

Frohman was instrumental in the growth of Hinde & Dauch Paper Co. of Canada Ltd. and served as president of the National Paperboard Association for several terms.

W. Q. Reiniger, who was previously slated to become manager of Longview Fibre Co.'s container plant at Oakland, Cal., instead becomes manager at Los Angeles. He succeeds **A. F. Knaggs,** who resigned September 1. The Oakland post will be filled January 1 by **George Caploe,** presently office manager for the Container Div. at Longview, Wash.

George Caploe

E. R. Frisby

Edward R. Frisby has been named manager of industrial relations for Oxford Paper Co. He was formerly personnel director at the Rumford, Maine plant but has now been transferred to the New York, N. Y. executive offices. Succeeding Frisby at Rumford is **Ralph K. Caldwell,** who was previously assistant personnel director.

E. O. Wood has been promoted to chief planning and development engineer for Minnesota & Ontario Paper Co.'s Central Engineering Div. He was formerly resident engineer at the Kenora, Ont. newsprint mill.

W. C. McLendon has retired as a project engineer in the coating section of Consolidated Water Power & Paper Co.'s technical department. McLendon, who joined the firm in 1942, is being succeeded by **Hugh Burnie,** Wisconsin Rapids Div. chemist since February 1957.

H. R. Jones, plant superintendent since 1948, has been named manager of the Muskogee, Okla. plant of Container Corp. of America.

Dr. Willem Prins has been named research associate with the Cellulose Research Institute at the State University College of Forestry in Syracuse, N. Y. Educated in Holland,

Nine Publications for Papermakers

Pulp and Paper, Volume 1 (Casey)	$18.00
Pulp and Paper, Volume II (Casey)	18.00
Paper and Paperboard Making (Williamson)	6.00
Technology of Paper Coating	2.00
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
Notes and Observation on Beaters	1.00
Trouble on the Paper Machine	.75
Technology of Papermaking Fibres	.50

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MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.00—	13.50
Soft unbleached muslins	15 50—	16 00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cutting	—	

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	.60—	.65
No. 2 roofing (Chicago)	.40—	.45
Twos and blues, repacked	1.50—	1.75
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—	
Gunny No. 1, foreign	—	
No. 1 manila rope, domestic	7.75—	8.25
No. 1 manila rope, foreign	6.25—	6.50
New burlap cuts (soft)	6.00—	6.50
Sisal strings	—	
Mixed strings	—	

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—115.00
No. 1 hard white shavings	85.00— 90.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	55.00— 65.00
Fly leaf shavings, No. 1	17.00— 22.00
Fly leaf, woody, No. 1	17.00— 22.00
Mixed colored shavings	18.00— 20.00
No. 1 books and magazines	17.00— 18.00
Ledger stock, white, No. 1 (carloads)	40.00— 45.00
Ledger stock, colored, No. 1 (Midwest ship)	25.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	50.00— 60.00
Colored tab cards	40.00— 50.00
New northern kraft envelope cuttings	60.00— 65 00
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	50.00— 55.00
No. 1 overissue news	14.00— 16.00
Folded news, special	15.00— 16.00
Folded news, ordinary	12.00— 14.00
Old corrugated boxes	23.00— 24.00
New jute corrugated cuts	19 00— 20.00
Mill wrappers	9 00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	2.00— 5.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, work, cwt.	5.20—
1-Arginine, drums, kilo	74.80—
Blanc Fixe	
Direct process, bags, C. l., works, ton	115.00—
L. c. l., ton	125.00—
Bleaching Powder, drums, cwt.	
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00—
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— 35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered lb.	.29⅜—
Litharge, commercial powdered	
Barrels, c. l., works, freight equalled, lb.	.14¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
E	—
F	—
G	—
WW	9.35—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	7.60—
N	7.70—
WG	8.15—
WW	8.40—
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper Bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—
Solid, 76%, drums, c. l. works, cwt.	4.30—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	25.00—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09¼—
High-tinting, drums, c. l., lb.	.09—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l., freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	
Sulfate screenings	
Groundwood, dom.	82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.50
Butchers, counter rolls	10.50
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

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Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

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SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

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NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

he was formerly research associate at Cornell University working on the behavior of non-ionic detergents in non-aqueous solvents. At Syracuse Dr. Prins will study the physical chemistry of cellulose.

Stanley O. Baughman has been appointed manager of Container Corp. of America's new corrugated box plant at Dolton, Ill. He joined the firm in 1945 as a member of the central laboratory staff in Chicago.

Adrian R. Fisher has become chief executive officer of Johns-Manville Corp. in a realignment of executive responsibilities following the retirement of **Leslie M. Cassidy,** chairman. At the same time **Clinton B. Burnett** was elected to the new office of executive vice president. Fisher, who joined J-M at Waukegan, Ill., in 1923, will continue as president and director.

A. R. Montgomery has retired as manager of the lumber and logging department of Fraser Companies Ltd. at Edmundston, N. B. He is succeeded by **V. C. Bastin,** who was formerly assistant manager. **J. E. Whittaker,** who was general superintendent, succeeds Bastin.

John S. Konkol, paper machine tour foreman since 1952, has been named superintendent of paper machines at the Biron Div. of Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. He succeeds **Fred R. Leverance,** who has retired with 49 years' service.

James Berryman, since 1954 supervisor of systems and procedures at the Port Edwards, Wis. mill, has been transferred to the newly acquired Potsdam, N. Y. plant of Nekoosa-Edwards Paper Co. He will implement procedures related to order processing, finance and industrial relations.

Andrew J. Schroder II has been elected a director of Scott Paper Co. and appointed to the newly created position of administrative vice president. He was formerly vice president in charge of industrial and public relations.

Harry W. Gochnauer has retired as chief engineer for Marathon Southern Corp. at Naheola, Ala. Instrumental in designing and constructing the new Alabama mill, he retires after 36 years in the paper, pulp and converting industries. He was chief engineer for Northern Paper Mills in Green Bay, Wis., when that firm was merged into Marathon in 1953.

Harold L. Bills has been elected president of Saniwax Paper Co. in Kalamazoo, Mich., to succeed the late Stuart Irvine. He has been with Saniwax 30 years, serving since 1951 as vice president in charge of sales and assistant general manager.

Allied Personalities

Douglas G. Sutherland, formerly vice president of Sutherland Refiner Corp., has been appointed assistant to the general manager of the Shartle Div. of Black-Clawson Co.

Jean F. Gschwind, vice president and general manager of Ross Midwest Fulton Corp., has been made vice president for development and research for J. O. Ross Engineering Corp.

James B. Clarke, at the Chicago sales branch since 1930, has been appointed sales representative for the National Aniline Div. of Allied Chemical & Dye Corp. in Portland, Ore.

Frank B. Eilers, with the firm since 1917, has retired as senior sales representative for Orr Felt & Blanket Co. His territory (Minnesota, Wisconsin, western and upper Michigan and northern Illinois) has been assigned to **Claire Lage,** who has been on the Orr Felt & Blanket staff since March 1957.

Lunkenheimer Co. of Cincinnati has expanded its home sales organization: **George W. Lambertson,** formerly Chicago branch manager, becomes divisional sales manager; succeeding Lambertson at Chicago is **Jack W. Montgomery,** former Chicago sales representative.

W. J. Frair, formerly with Canadian International Paper Co., has joined the application engineering department of Bristol Co. of Waterbury, Conn. He will specialize in applications relative to the pulp and paper industry.

Signode Steel Strapping Co. has announced six new regional managers (formerly district managers): **C. J. DaCosta,** Cleveland; **R. E. Jacobs,** St. Louis; **T. E. Noon,** Boston; **Almer Pearson,** New York; **S. N. Salomon,** Pittsburgh, and **J. R. Williams,** Chicago.

Ray Marsh, chief project engineer since 1956, has been named pulp

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Names in the News . . .

and paper contract engineer for Walter Kidde Engineers-Southwest.

William S. Mounts, associated for 11 years with Sutherland Refiner Corp., has joined the sales and engineering staff of Valley Iron Works Co. of Appleton, Wis.

Bauer Bros. Co. has announced the following appointments: **Roger J. Shouvlin,** vice president, administration; **Lee Eberhardt,** assistant to the president; **Ben Perks,** assistant to the administrative vice president and manager of field service; **Harry Fishbough,** export manager; **James E. Irvine,** assistant director of engineering; **R. J. Proctor,** administrative assistant to the director of engineering; **Don Borden,** manager of refiner sales; **E. L. Rastatter,** manager of cleaner sales; **A. H. Adams,** manager of Pressafiner sales; **W. M. Orchard,** manager of projects, and **C. L. Durkee,** assistant to the president and manager of digester sales.

Robert P. Calvert, formerly with the purchasing department of Continental Paper Co., has been appointed New York State sales representative for John W. Bolton & Sons Inc. and its Emerson Mfg. Co. Div.

Necrology . . .

Charles H. Piper

Charles H. Piper, 62, superintendent of the bleach plant and stock preparation at Moraine Paper Co., died late in November at his Dayton, Ohio home. (Moraine Paper is at West Carrollton.)

Piper joined the firm in 1949 following associations with Wausau Paper Mills Co., E. I. duPont de Nemours & Co. Inc. and Waterfalls Tissue Corp.

J. Edgar Forscht, erecting engineer for Pusey & Jones Corp., died suddenly early in December at Wilmington, Del. He had been associated with P&J 34 years.

Edwin R. Bartlett, 74, former president and board chairman of Hooker Electrochemical Co., died in December at his winter home near Sarasota, Fla. Named works manager for Hooker in 1919, at the time of his death Bartlett was a director and chairman of the finance committee.

T. Alfred Rowlands, 63, New York and New England sales representative for Waterbury Felt Co. of Skaneateles Falls, N. Y., died in an Auburn, N. Y. hospital in November. He had been with the firm 45 years.

Clarence E. Bruner, resident manager at the Crown Zellerbach Corp. mill in West Linn, Ore., from 1930 to 1945, died recently at the age of 74. He began his paper industry career at the age of 14 with one of CZ's predecessor firms.

Charles H. Baker, 47, assistant to the general manager of Newton Falls Paper Mill Inc. in Newton Falls, N. Y., died unexpectedly in November. Death was attributed to a heart attack.

Walter C. Sisson, former president and secretary-treasurer of Racquette River Paper Co. Inc. of Potsdam, N. Y., died in November following a year of ill health.

A new alkaline pulping process

A new pulping method that has the advantage of a marked economy in alkali consumption (25-30 per cent) is reported from Germany. Cooking is done in two stages. The chips are first heated with a 2-per cent caustic soda solution to dissolve the pentosans that normally consume the bulk of the alkali in the early stages of digestion.

The completely spent liquor is then drawn off and the digestion completed with a fresh 2.2-per cent heated caustic soda solution. After completion of the second stage of the digestion, the caustic liquor (1.2-1.6 per cent caustic soda) is drawn off, concentrated to 2 per cent and used in the first stage of the next cook.

In addition to the 25-30 per cent saving in caustic soda, this process has the added advantage of retaining less organic material in the cooked pulp, thus facilitating the subsequent washing operations.

Problems at the suction boxes

To reduce wear of the wire at the suction boxes to a minimum the boxes should be made of materials with a low coefficient of friction, and the width of the boxes should be kept at the minimum required for effective drainage. This is reported from the U.S.S.R.

In specially designed experiments it was shown that for maximum efficiency it is also essential to increase the vacuum in each successive suction box. Thus, with three suction boxes 300 mm. wide and a vacuum of 60 mm. Hg in each box, the moisture content of the sheet was reduced to 91.8 per cent. However, with a vacuum of 40 mm., 60mm. and 80 mm. Hg in the successive suction boxes, the moisture content was reduced to 91 per cent and even less.

New metallized paper

Continental Can reports the development of a new metallized paper for use as can and bottle labels, carton overwraps and tight wraps for set-up boxes. The advantages claimed for this paper are quick-drying of adhesives, easy removal of labels in bottle washing, good printability and cost economy.

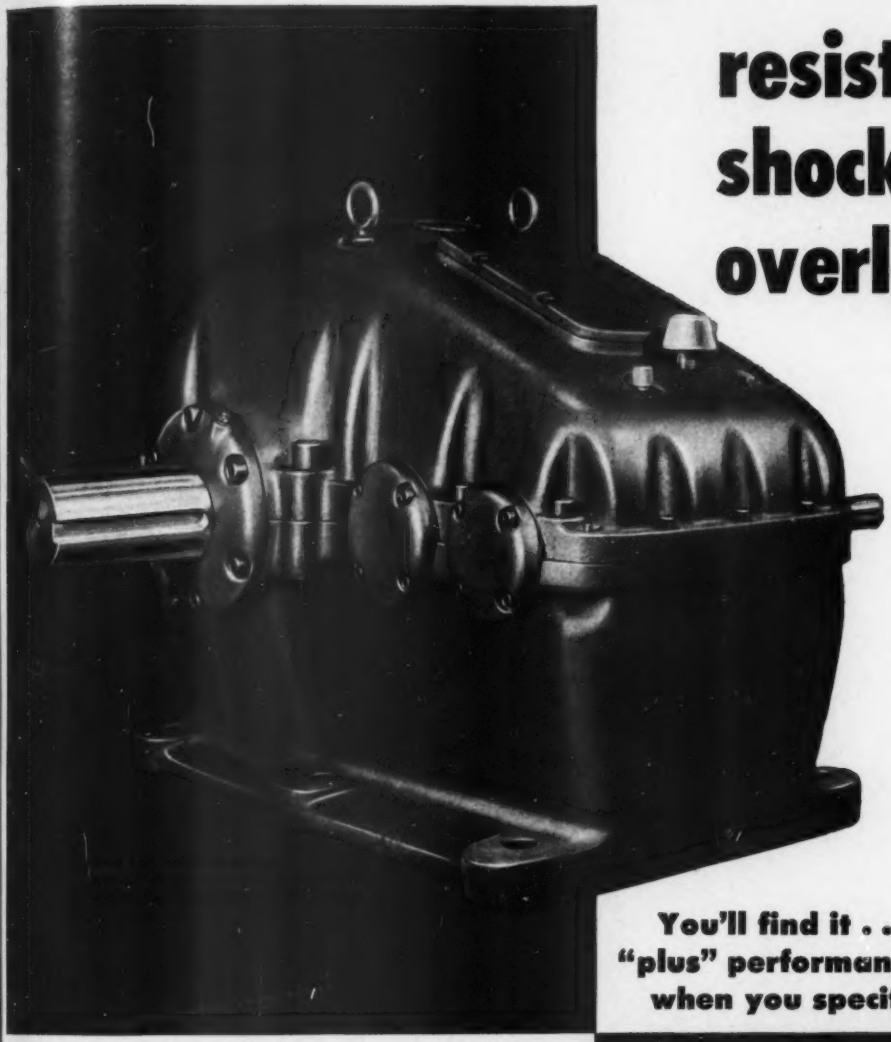
The metal, aluminum, is applied to the paper by the vaporized metal process developed by Dr. Paul Alexander.

New type multiwall bag

A new type multiwall paper bag with valve reducing insert, developed jointly by Owens-Illinois Glass and Wyandotte Chemicals, makes possible the use of a standard length and width bag. The only variation is the thickness of the filled bag, which may range from 3½-6½ in. depending on the bulkiness of the packaged material. The advantage of this bag is that it permits standardization of pallet patterns. The bag is three-ply, with two 40-basis weight sheets and one 50-basis weight sheet of natural kraft paper.

In parallel shaft drives . . . look for

resistance to shock and overloading



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Under the shocks and overloads that are often encountered by parallel shaft gear drives, rugged housing construction is vital if shaft alignment is to be maintained. That's why Link-Belt adds special reinforcement at points of greatest stress . . . has developed this design expressly for endurance in heavy-duty service.

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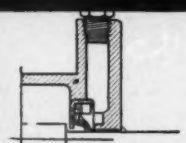
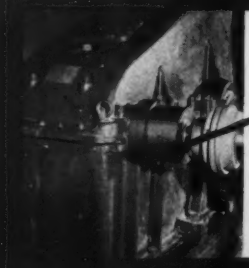
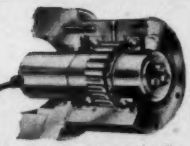
Automatic splash lubrication reliably supplies oil to all gears and bearings.



Grease-lubricated seals on all input and output shafts prevent entrance of dirt, water.





Backstop automatically prevents reverse rotation of output shaft due to power stoppage or other causes.

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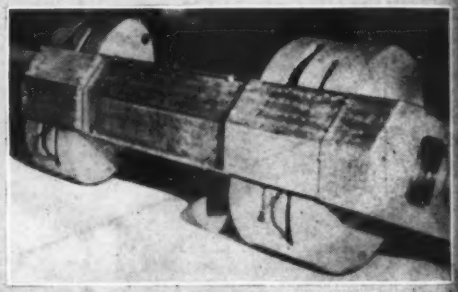

creases in production costs. One of the country's major paper mills paid for the Hurletron system with the above savings in less than four months. Find out how you can become more competitive, still maintain customer specifications, and have a better profit picture . . . ask about the Hurletron today.

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